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DEVOTED TO CIVIL ENGINEERING AND CONTRACTING

F. E. SCHMITT, *Editor*

Volume 103 NEW YORK, JULY 25, 1929 Number 4

Riverbank Encroachment

A NEW episode in a long-drawn-out chain of events was concluded this month when the War Department rejected New York City's request for a narrowing of the Hudson River channel in order that longer ships could be berthed in the pier slips. More than twenty years ago this proposal was first put forward, and it has been repeated on numerous occasions since then, each time to be rejected by the federal government as an injurious encroachment on necessary waterway space. Everyone familiar with the river knows that its channel is none too wide even now, especially with the large volume of transverse and diagonal ferry traffic, including extensive railway car ferriage. But the city authorities, though they know these conditions, are susceptible to the potent lure of the dollar, and when they see prospects of getting extra pier and slip space at the water end without cost, in place of paying heavily for corresponding space at the land end, they become blind to the need for river capacity. Broadly, the spirit of these extension requests is the same as that which has made the history of nearly all our watercourses a story of constant encroachment on the natural channel. The result has been most strikingly apparent on minor streams, where choking produces flood losses on a large scale, demonstrated anew in nearly every year's flood season. Constriction of navigation width is equally harmful, though the losses may not become so directly evident. The department's attitude toward the preservation of channel width is sound and constructive and in accord with its proper function in such matters. It deserves the support of all who look beyond the exigencies of the moment.

Encroachment of Another Kind

SOMEWHAT different reflections are awakened by the question of the application for approval of plans for a bridge over the Mississippi River at New Orleans. The War Department is reported to be opposed to the project not because the design clearances are insufficient but because the department thinks no bridge should be built at the proposed location. This attitude implies a novel assumption of function and authority. Congress charged the War Department with the duty of protecting the interests of navigation, not that of establishing pier locations. The duty assigned to the department is to keep channels sufficiently wide, deep and free from obstruction, but it does not include a mandate to like or dislike some particular site for a bridge. But the situation becomes more easily understood if the constant tendency of government bureaus to encroach upon fields outside their designated spheres is recalled. In former days the War Department was scrupulously, even narrowly, observant of the instructions of the law, so much so that when the great floods in the Central States sixteen years ago raised the question of controlling encroachment on high-water channels of rivers the department kept hands off, holding that its navigation interest was confined to the low-water channel. Compared with that ultraconservative attitude, the present quest for more power presents a strange contrast. It constitutes a supporting reason for the suggestion made in this column some weeks ago that bridge questions, involving claims of both water and land transportation, should be taken out of the hands of a partisan authority and placed in charge of a body composed of representatives of the several interests involved.

Resource in Emergency

BECAUSE emergencies furnish one of the severest tests of the engineer's worth, it will always be a fascinating and instructive thing to contemplate an unexpected situation which arises in a construction enterprise, and the resourcefulness and ingenuity displayed in meeting the situation. In this light the salvage of the Newark Bay lift span reported in this issue commands particularly close attention, although the unparalleled accident which gave rise to the salvage work is cause enough for a careful study of the operation. Through this accident the contractors were confronted at a moment's notice with the problem of lifting a double-track railroad bridge span weighing 1,500 tons from the bottom of the bay. There was no directly applicable experience in bridge-building history to serve as a guide, and the work had to start from first principles. Planning boldly and yet conservatively, the engineers worked out a scheme and carried it through with admirable care in details, to the successful accomplishment of the raising of the span. There is much in the story to supply keen interest to the bridge engineer and in fact the constructor in every branch, but the account is even more valuable as a reminder that every engineer needs to prepare himself early in his career to engage and overcome unexpected difficulties whenever they may arise. The critical periods of his future career are likely to center about emergency conditions, and unless he supplements his day-to-day abilities with the power to think quickly and truly, and act decisively, upon the call of an emergency, he may fail.

Avoidable Defects

MUCH discussion has waged in engineering circles on the Coast over the buttress cracks in the Hodges dam, north of San Diego. One group believed the dam to be in dangerous condition, while another group considered the cracks to be harmless. Careful study by a special board of engineers leads to a verdict of acquittal; their finding, given on another page, is that the dam is safe in its present condition, so far as the cracks are concerned. It is a reassuring verdict,

especially because buttress cracks in hollow dams have repeatedly been cause for alarm, most recently in the sensational case of the Lake Pleasant dam in Arizona. But even with this acquittal the stubborn fact remains that cracks in dam buttresses are a serious defect, one which ought not be allowed to occur either in buttresses or in any other structure that is designed to be monolithic. Once a monolithic member is fragmented irregularly by cracks its structural action is in doubt; accurate tracing of stresses becomes difficult or impossible, and then the question of safety or danger is rendered one of clashing opinion. In dams such a situation cannot be tolerated, for their integrity must be beyond question. Even in massive dams cracks are a disquieting thing, and their prevalence, suggesting that monolithic construction is an unattainable ideal, constitutes strong argument for more thought of whether such a dam should not be built as an assemblage of distinct blocks rather than as a monolithic mass, in order to predetermine the planes of separation and thereby make the structural action subject to the designer's control. In buttresses, where it is possible to apply heavy reinforcement to the end that cracking may be prevented entirely or else to give positive assurance of structural action, there should be no more occasion for alarm such as aroused by the Lake Pleasant and Hodges dam instances. Experience with buttress cracks is sufficiently impressive to make it the dam builder's prime duty to see that future construction will be free of this defect.

Clarifying Standardization

WHAT significance attaches to the joint statement of the American Standards Association and the U. S. Bureau of Standards on their relative spheres and functions, issued last week, will probably remain to be developed by future experience in their activities. On its face, however, it bears the welcome implication that the two bodies will serve different and non-conflicting uses. The Bureau of Standards will confine itself to serving as resort for initial standardization efforts of those industrial or commercial groups which are unorganized or which for other reasons have no common meeting ground. The association, on the other hand, will be the forum for the discussions of better organized groups of producing and using interests who have agreed on a standard and desire it reviewed or definitely recognized. If the effect of the document works out accordingly, it will clear up a situation that has often been confused. Helping to make standards for industry is not a desirable function for government so long as the industrial and commercial arts are prepared to do the work themselves, for the monitorial and paternal element of the federal government is out of place in matters where only the producer, the consumer and the general public are involved. In the past decade technical and industrial organizations have evolved far enough to be capable of dealing with their standardization needs, with the help of bodies like the American Society for Testing Materials, the American Standards Association and some others to supply a meeting ground and helpful guidance as to methods. Conceivably one might take the ideal view that governmental responsibility included the duty of urging, or even compelling, standardization on the score of efficiency and avoidance of waste. But this view remains Utopian. Present conditions of the human race, at least in civilized countries, make it proper that the determination of standards of form, type, grading or quality be worked out by harmonizing the views of the several parties to their application, without bringing to bear governmental machinery or authority. In furthering this end the agreement just arrived at will promote the sound growth of standards.

A Study of Earth-Moving Equipment

AMERICAN and German engineers have exhibited a quite different genius in developing equipment for large-volume earth moving. The huge German excavators and transporters described by Mr. Krauth in this and a preceding issue have no counterparts in type and use in this country. Resemblance in a degree to the German transporters for distributing spoil is found in America in some of the devices for stockpiling coal and ore. Spoil distributors of somewhat similar conception were developed 35 years ago for use in building the Chicago Drainage Canal, but since the construction of that work they have had no further American use or development in earth handling. The continuous bucket excavator is (except in small sizes and for trench excavation) virtually an unrecognized tool in America. On the other hand, single-bucket excavators such as are used in American work—power shovels and dragline and cableway excavators—appear to be equally minor factors in German earth handling.

This radically different practice excites interest, particularly as there is no obvious reason why it should exist. The volume of earth moving in Germany is no greater than in America, and probably much smaller. Large excavating units are not unfamiliar in American equipment production. The 350- to 400-ton draglines used on the Mississippi levees approach the larger German bucket excavators in weight, and the most recent 580- and 850-ton mine-stripping shovels far outweigh them. Soils and soil conditions are not generally unlike in Europe and elsewhere. Dams, canals and open pit mines are much the same everywhere. It is true that in one of America's largest earth-handling operations—the Mississippi levees—borrowpit restrictions limit the types of large excavators applicable, but they eliminate the large power shovel as completely as they do the continuous bucket excavator of the brown-coal fields of Germany.

The fact remains that power shovels excavated the Panama Canal, are building the Saluda dam, and are stripping Minnesota iron deposits and Pennsylvania coal seams, and that these operations involve no controlling physical conditions which are not being met successfully by the continuous bucket excavator in Germany. Indeed, if German constructors were to equip these works, it is probable that they would adopt the machines of the brown-coal mines, the Ottmarchau dam and the Mitteland Canal. In building the canal for the Shannon River power development they brought their excavators and transporters to Ireland, though in the British Isles the power shovel is as dominantly the device for heavy excavation as it is in the United States. Since the Irish canal work was secured by competition, it must be inferred that the German constructors regarded power-shovel prices with no fear.

Certain it is that the figures given by Mr. Krauth indicate an impressive economy in manpower in German brown-coal mining. Improvement in the mechanization for excavation which has doubled and trebled the ma-

chine output per man and has cut in half the number of workers in a great industry is an engineering accomplishment of the first order. These figures, however, give no definite basis for a conclusion as to whether the continuous-bucket excavators of Germany are more efficient than the single-bucket draglines and power shovels of America, since no truly comparable figures are available. The problem is well worth some attention to solve.

The broadly significant lesson of German development of earth-handling machinery, however, lies not so much in its possible superiority or inferiority to American machinery as in its evidence of the general advance of machinery in construction. The European constructor, though working under less pressure of wage rates, is finding it quite as profitable to develop labor-saving machinery as have American constructors. Abroad as well as in this country the constructor's processes are proving as susceptible of economic improvement by mechanization as have those of the factory; the figures of brown-coal mining given by Mr. Krauth challenge the records of economy shown by the factory.

Articles like those of Mr. Krauth indicate too that constructors at home and abroad need to draw more frequently on one another's experience, as has long been done in the more strictly professional engineering fields of sanitation and structural design. With more perfect mechanization, construction ceases to be a thing of local practices and becomes a problem of co-ordinating universal experience, as has been done in engineering design.

Competitive Bidding Reform

CONTROVERSIES over the "lowest bid" requirement of public-works contracts develop frequently enough to keep active the question whether search for a substitute practice is not demanded. Indeed, substitutes are being proposed which range from granting greater power of elimination to contracting agents to the ultimate in correctives of abolishing present practices completely and giving contracting agents unrestricted power to choose and name who shall construct public works. No doctrine is too radical to attract disciples, and they can pick out examples in practice which justify any mode of action they can invent. It is time to do some reasonable thinking.

There is but one purpose in competitive bidding for public-works construction; that purpose is to determine the lowest bidder capable of performing the work *precisely according to contract*. Let this qualifying condition be noted with particular attention, for it is inseparable from the fundamental concept of competitive bidding and every contract is written to insure compliance with it. But it also introduces the incalculable factor of discretion: It imposes on the contracting official not the simple arithmetical task of determining the lowest bid but the discretionary power of deciding who is the lowest bidder capable of performing the work precisely according to contract.

Liberty to cast out the lowest bid is exercised frequently in practice. It is implied in the term "lowest and best" or "lowest responsible" bid almost universally employed in statutes and ordinances governing public-works contractual procedure. The courts in many decisions have upheld the exercise of such liberty. In practice, in statute and in court decision, however, there is the implication that the contracting agent must show cause in exercising his right to eliminate the lowest bidder. In this fact is found the source of low-bid controversies.

The situation is complex. Competitive bidding is so universally a requirement in contracting public works that in the mind of the people it stands as a basic principle of government. They would give short shrift to any proposition to abandon the practice. By the same reasoning they are suspicious of any attempt to discard the low-bid price as a criterion of true competition. Contractors and contracting agents would like to have some better measure if it can be provided without abandoning competitive bidding. This they would not eliminate. They find it is a safeguard to themselves as well as to the public funds.

As the low-bid question presents itself for review it involves these queries: With all the evils charged to its influence, do contractors and engineers for public works wish the lowest bid criterion of contractual qualification abolished? Is it even desirable that as much liberty as is now common be granted the contracting agent to vary from the arithmetically lowest bid in awarding his contracts? Assuming that some other selective power over bidders should be granted the contracting officer, should not this selection be required ahead of receiving bids and then afterward there should be no alternative to giving the lowest bidder the award?

At present the swing of sentiment is toward prequalification. In state highway departments the practice is quite common. In fairly wide measure public-works engineers in general approve the principle. Contractors' associations have vigorously promoted the practice and empowering legislation was considered last winter in several states and was enacted in one or two.

While in principle prequalification has been well accepted, it obviously is in use that the test will come. This has to be well considered. Any consideration, moreover, has to start with the fundamental doctrine that no prequalification practice fulfills the requirement of fair dealing—if indeed it will meet the laws—which does not set down definitely in the call for bids the qualifications required of the bidder. Prequalification as it is practiced today retains too much after-the-fact discretionary power. It also too often denies the privilege of appeal. It does not guarantee that the low bidder will get the contract. Too many uncertainties and ambiguities already prevail in contract practices to assure the builder of the best prices from contractors; vague and unwritten terms of prequalification should not worse confuse the bidder.

Competitive bidding practice, however, demands a more stringent corrective than prequalification. The wide range of prices bid, the frequent failure to judge costs by contractors renowned for shrewd estimates, the large number of suits at law over contract terms and settlements, all point to weaknesses of contractual procedure and indicate that a thorough review of contract and specification practice is in order. In recent years there has been some progress in simplifying and standardizing contract terms. Progress has been made in substituting arbitration for arbitrariness. All of these together fall far short of the measure of reform required.

Radical revision is needed of the whole practice of contract preparation, drawings, specifications, bonds, advertisements and information for bidders, securities required and procedure of awarding contracts. Contractors and engineers alike have been remiss in not forcing the issue, and this neglect is responsible for the fact that contract construction is struggling today for stability under a cumbersome and antiquated procedure.

Sewage-Works Operation at Worcester, Mass.—I

Three Articles Summarizing Experiences, Results and Lessons of Four Years' Operation of Grit Chambers, Imhoff Tanks, Sprinkling Filters and Final Settling Tanks

By Roy S. Lanphear
Supervising Chemist of Sewage-Works, Worcester, Mass.

Grit Chambers and Bar Screens

Worcester, Mass., was the first city of size in the United States to build sewage-works—a chemical precipitation plant put in use in 1890. This was supplemented by intermittent sand filters added from time to time until 735 acres were provided. Growth of the city and changes in sewage-treatment methods made a new plant necessary. Experiments with activated-sludge and Imhoff tanks led to the conclusion that the latter, with sprinkling filters, were best suited to Worcester conditions. Such a plant was completed in 1925, making use of the intermittent sand filters for sludge drying. Operating methods and results of the new works, presented under the general heads of preliminary, Imhoff tank, and final treatment, have been described in *Engineering News-Record* by the supervising chemist in charge of operation. Each of the three articles by Mr. Lanphear is prefaced by a condensed description of the portion of the works concerned to aid in understanding the account given of operating results and methods. The article that follows deals with preliminary treatment. —Editor.

THE present sewage-works of Worcester, Mass., is of the Imhoff tank trickling filter type and was placed in operation June 25, 1925. It consists of a two-compartment grit chamber, two bar screens, twelve double Imhoff tanks, four pairs of dosing tanks, 13.56 acres of trickling filter, four final settling basins and 23 acres of sludge-drying area. The large sludge-drying area is explained by the utilization of intermittent sand filters formerly used for sewage treatment. Four years of operation have demonstrated that the plant successfully cares for the sewage of the city, as the articles of which this is the first are designed to show.

Plant operation usually shows the need of some alterations and additions which greatly facilitate the working of the plant or add to its appearance. Generally these conditions arise as a result of enforced or attempted economy. Owing to lack of funds, alterations and additions at Worcester have been going on slowly and probably will so continue for a few years longer.

Combined sewers bring to the plant an average daily sewage flow of 23.79 m.g.d. (1928) from a connected population of about 190,000 persons. The plant design was based on an average daily sewage flow of 28 m.g.d. from a population of 242,000 in 1934.

LABORATORY AND ADMINISTRATION BUILDING, WORCESTER SEWAGE-WORKS

The building is 35x50 ft. in plan. The snow gives some indication of winter conditions met in operating this plant, which consists of grit chambers with bar screens, Imhoff tanks with sludge-drying beds, sprinkling filters and secondary settling tanks.

TABLE I—VELOCITY OF SEWAGE FLOW IN GRIT CHAMBERS
Computed by Worcester Engineering Department

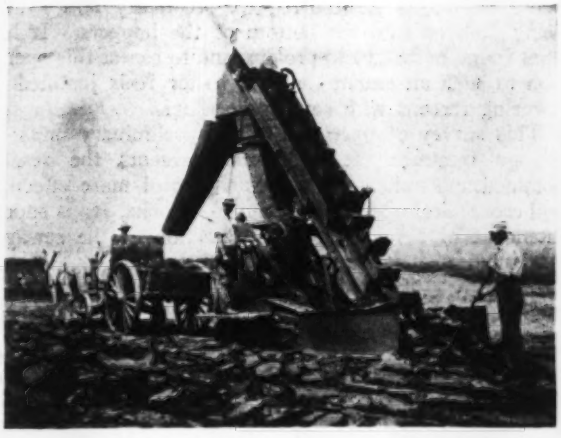
Volume, M.G.D.	Depth of Flow, Ft.	Velocity, Ft. Per Sec.
62.81	6.00	1.04
66.6	5.52	1.21
60.38	4.75	1.28
55.55	4.40	1.28
49.86	4.05	1.25
45.24	3.77	1.22
40.21	3.50	1.17
34.99	3.20	1.12
31.00	3.00	1.06
28.3	2.80	1.05
25.02	2.65	0.98
20.6	2.40	0.90
14.98	2.00	0.79

The effective length of the grit chambers is about 75 ft. and the grit-collection pits are 7 ft. wide, 37 in. deep at the inlet end and 55 in. at the outlet end. The width of each chamber increases from 7 ft. to 8 ft. in 3 ft. of depth above the invert of the 72-in. sewer and then remains the same to the top of the chamber. At the outlet end of each chamber is a bar screen with 2 in. of clear space between the bars.

Velocity of sewage flow through the chambers during normal flows throughout most of the year varies from 0.82 to 1.06 ft. per second during the middle of the day. The velocity of sewage flow through the two chambers with various rates of flow is given in Table I.

The question is asked: "Are these velocities of flow in time of high stormflow effective in removal of grit and sand?" Deposits of sand have been found in the side channels of the Imhoff tanks following periods of operation during which the grit chambers were not filled with grit or soft sludge. This has not been true following every high flow and leads to the conclusion that the quantity and character of the material carried by the storm sewage are factors to be considered. The most noticeable occurrence followed a number of heavy rains in August, 1927. When the direction of flow in the Imhoff tanks is changed each month, it is not unusual to find a thin coating of sand on the bottom of the side channels which have been carrying sewage.

The depth of soft and hard material, or sludge and grit, in the chambers is measured once or twice each month and the chambers are flushed at least once every month, regardless of the amount of heavy material. This is done through a 30-in. gate on the easterly side at



REMOVING DRIED SLUDGE WITH A LOADER

the outlet end of each chamber, the inlet gate being operated to supply the flushing water. The material passes on to an old intermittent sand filter, which is cleaned once a year.

Monthly measurements of depth of material in the grit chambers show: (1) Only a few inches depth of soft material is found on top of the heavy grit in the inlet half of the chambers regardless of the quantity of heavy grit. (2) The usual depth of soft material in the outlet quarter-length of the chambers is from 24 to 36 in. Very little grit or heavy material is found at this end of the chambers. (3) During a dry month the chambers are not nearly filled with material and the proportion of soft top material to total deposit has been as much as 40 to 45 per cent. (4) During a wet month, when the deposit has been from 90 to 95 per cent of the capacity of the pits, the soft top material has been from 15 to 30 per cent of the total deposit. (5) The greatest quantity of grit is deposited in the second quarter, or from 20 to 40 ft. from the inlet end of the chambers.

Additional factors for consideration in this connection are two in number: (1) entrance velocity and (2) possible effect of the bar screens. The sewage flow is distributed to each chamber against a knife-edge wall with no provision for making the chamber velocity effective until the entrance velocity has been carried some distance into the chambers. The bar screens are maintained in a reasonably clean condition during stormflows, yet they cause a slight backing up of the sewage and exert an influence upon the manner of deposition of the grit. It appears that similar installations with provision for partial elimination of the entrance velocity being carried so far into the chambers would result in effective chambers of shorter length than 75 ft.

Flushing of the grit chambers, as practiced, cannot be considered a successful method of cleaning them. It is a financial success if we consider only the cost of flushing or the combined cost of flushing and the cleaning of the old intermittent sand filter as compared with mechanical means of cleaning with special equipment, which involves capital outlay. The sand filter is cleaned with a bucket loader, which is an essential part of the equipment used for handling large quantities of dried sludge each year.

Our experience with flushing the chambers is summarized as follows: (1) As the water main is only 2 in. in diameter, a fire hose stream cannot be used for flushing. (2) Flushing by opening the inlet gate of a chamber which has been drawn from will not move the bulk of the heavy grit from the inlet half of the chamber to the 30-in. gate. (3) After the first monthly flushing, the remaining deposit amounts to about 25 per cent of the capacity of the grit compartments and after the third monthly flushing it has increased to nearly 45 per cent, sometimes being fully as great as the quantity removed. (4) Cleaning the chambers of grit by shoveling or mechanical means is necessary for the proper protection of the Imhoff tanks. (5) Safe provision for a rainy month requires that, following three flushings, the chambers should be entirely cleaned the fourth month. This has been done, but not regularly, with an autocrane which has been available at times.

The possibilities of successfully cleaning the chambers by flushing are good. A larger water main can be installed which will permit of the use of a fire hose stream; the water pressure at the plant is about 160 lb. The bottoms of the chambers can be altered so that they slope to a center hopper, or one placed about 30 ft. from the inlet end; the same sand filter can be used as now. No purchase of mechanical equipment should be necessary; flushing should result in cleaning each time. The cost of cleaning would be materially reduced. More frequent cleaning of the sand filter is planned, and this should also result in further economy.

Flushing requires three men about four hours. The cost of six flushings during 1928 varied from 10.1 to 18.2c. per cubic yard of material removed, averaging 12.8c. Until a chamber is cleaned, each flushing costs more than the preceding one owing to the smaller quantity of material removed and the effort made to remove as much as possible.

Flushing and cleaning require two additional men, an autocrane operator and a dump-man; two men work in the chamber and the third acts as signal man to the operator. Three such cleanings were made during 1928 at a cost of 61.6c. per cubic yard. Of a total of 407.1 cu.yd., it is estimated that the autocrane removed 210 cu.yd. Assuming that 197.1 yd. was removed for 12.8c. per cubic yard, the cost of removal of the heavy grit averaged $1.07 per cubic yard, exclusive of any machine charge.

In October, 1928, the sand filter was cleaned by the bucket loader at a cost of 45.2c. per cubic yard, exclusive of any machine charge. The operating crew consisted of four men: the machine operator, two ground men and a dump-man. The total cost of flushing, or removal of the flushed material from the chambers to the final point of disposal, averages about 75c. per cubic yard.

Data concerning material taken from the grit chambers after the sewage and much of the soft top material had been removed are given in Table II.

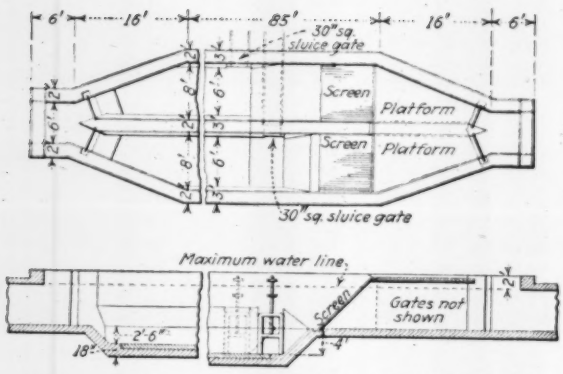
The quantity of material removed from the grit chambers during 1928 totaled 1,262 cu.yd., or 4.05 cu.ft. per million gallons of sewage. A conservative estimate of the quantity of soft top material included is about 350 cu.yd.

TABLE II—MATERIAL REMOVED FROM GRIT CHAMBERS

Expressed in percentages

	Inlet End	Middle	Outlet End	Grit After Flushing
Moisture	26.1	59.0*	63.4*	14.1
Dry solids	73.9	41.0	36.6	85.9
Volatile matter	28.4	59.3	65.4	8.2
Mineral matter	71.6	40.7	34.6	91.8
Iron	....	.....	....	0.86
Pounds per cubic yard	....	1,998	....	2,214

*Piled and drained for a few minutes.



GRIT CHAMBER AT WORCESTER SEWAGE-WORKS

Both center and side walls in the enlarged main part of the chamber are 2 ft. thick from the top for 5 ft. down, then thicken to 3 ft. in the next 3 ft. of depth and continue at 3 ft. thickness for the remaining depth, which ranges from 2½ to 4 ft.

The bar screens are each 8x11 ft. in area, with 2 in. spacing between the ⅜x3-in. bars. They have one tie-rod across the middle and are set at an angle of 45 deg. During maximum flow conditions approximately 68 sq.ft. of screen is utilized.

Ordinary operating conditions plan for screen attendance about 3½ hours during the afternoon, one hour in the evening and again in the early morning. During stormflows the second man on duty remains at the screen until rapid clogging of the screens passes.

The screenings are drained and removed by wheelbarrow to a low area about 100 ft. from the screen-house, where they are covered with dirt as the area is filled. Ample space is available for some years to come. No nuisance exists and disposal of screenings by burial has proved successful and economical. An interesting feature concerning the screenings is the frequent removal of whole bedsheets which come from the state hospital for the insane.

Screenings usually contain about 87 per cent moisture and weigh about 67 lb. per cubic foot. The volatile content is 77.4 per cent; fats, 3.67; nitrogen (wet), 0.176 per cent.

During 1928 the average daily quantity of screenings removed was 42.9 cu.ft. total, or 1.80 cu.ft. per million gallons of sewage screened. The usual minimum or Sunday quantity is from 18 to 21 cu.ft. and the maximum daily quantity from 27 to 48 cu.ft. The maximum during stormflows occurred Nov. 3 and 4, 1927, at the time of the record storm of recent years, when 225 and 204 cu.ft. was removed, respectively.

The cost of operation of the screens during 1928 averaged $5.16 per day, or 12c. per cubic foot of screenings, representing 21.6c. per million gallons of sewage screened. The screens are located about 1,600 ft. from the plant proper.

The purpose of screens is to remove a part of the floating and suspended matters contained in the sewage. Although large quantities of grease and matches may be found on the surface of the sewage in the Imhoff or settling tanks, the efficiency of screening is quite apt to be judged by appearances. Worcester experience indicates that in so doing, one important function of our bar screens has been overlooked. Difficulty has been experienced in drawing sludge from the Imhoff tanks, and large pieces of rags together with small sticks have been found in the sludge. It is believed that these materials accumulate to a certain extent at the bottom of the hoppers. Agitation is resorted to, secondary tank water being pumped into the bottom of the hoppers. It has been found necessary to prolong and to repeat this operation to such an extent that the writer feels justified in favoring screens with smaller openings.

This survey of operation of the preliminary units of sewage treatment at Worcester presents the results obtained and indicates the possibilities of more effective and economical operation. John H. Brooks, Jr., is superintendent of sewers, and the operation of the sewage-works is under the supervision of the writer.

New Method of Gasoline Production Result of International Research

Successful international co-operation in research is reported by an article in the June, 1929, issue of *Chemical & Metallurgical Engineering*, outlining the possibilities of a new petroleum treatment process developed jointly by the I. G. Farbenindustrie of Germany and the Standard Oil Company of New Jersey. By this high-pressure, high-temperature, catalytic method, crude oil and the heavy residues of the ordinary refining process can be converted into gasoline or other more valuable petroleum products by the introduction of hydrogen under high pressures in the presence of a catalyst, converting practically 100 per cent of the original oil into gasoline or other products. The new process involves a building up of the crude oil, as contrasted with the breaking down method used in the present cracking process.

Research leading to this development began in 1927, when the Standard Oil Company of New Jersey reached an agreement with the German company providing for joint research on the catalytic hydrogenation process. At that time this process was used chiefly in the hydrogenation of coal to produce motor fuel, which is carried on in Germany on a large scale. However, further investigation has led to its adaptation to fuel oil. That the process is commercially feasible is indicated by the fact that the Standard Oil Company has had a plant operating on a semi-commercial scale in Baton Rouge, La., for about a year, and that construction is now going forward on the first of two large plants which will compare in output with the average oil refinery.

East Abutment of San Gabriel Dam Is Leveled

Following two months' preparation, a shot was put off on the east abutment of the Los Angeles County Flood Control District's San Gabriel dam site which loosened the fractured rock overlying the sound rock on the entire east abutment, covering a base width of 400 ft. and a height of nearly 400 ft. above streambed. About 90 tons of black powder was exploded at one time, loosening about 150,000 cu.yd. of rock. Sixteen "coyote holes" had been drilled in the mountain side from which some 150 cross-tunnels or galleries had been drilled, each provided with "pockets" for the reception of the powder.

Following the loosening of the overburden by this shot, excavating equipment has been moved to the east side, and earth and loose rock are being removed to a location about a mile below the dam site.

The work on the San Gabriel dam was started in February and up to the present time has been confined to the erection of a construction camp and plant and to excavation on the west abutment.

General-Traffic Cable Tramways in Colombia

Aerial Roads From Manizales to Towns 37 Miles and 43 Miles Away Are Now Completed and 124-Mile Extension Is Planned

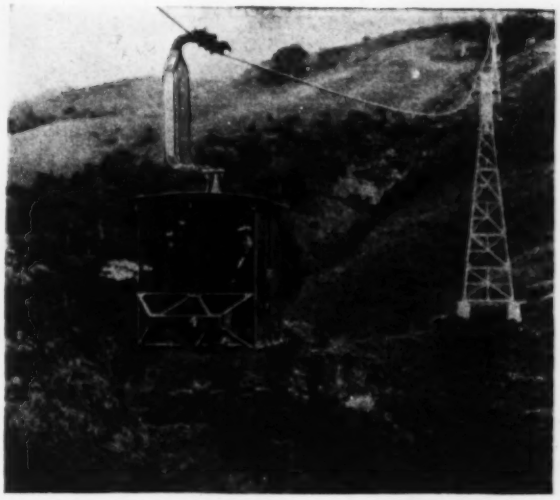
By R. Fawcett
International General Electric, Bogota, Colombia

FACED with the necessity of connecting the city of Manizales with the coffee districts, the Department of Caldas, in Colombia, has built two cable tramways of unusual length for general passenger and freight service. From Manizales a railway reaches the coast. Extension of the tramway lines to an ocean port is also contemplated, but only the two lines mentioned are considered in the present article. They are unusual both because of their length and because of their operation by electric power.

Location and Type—Investigation led to the decision that the best service would be rendered to the districts north by a line from Manizales to Aguadas, and to the districts west by a line from Manizales to Pueblo Rico, distances of about 37 miles and 43 miles respectively, with stations in all the towns along these routes. The construction of the lines from Manizales to Aguadas, known as the Cable del Norte, was undertaken by the Department of Caldas, while the line from Manizales to Pueblo Rico, known as the Cable del Choco, is being financed by the national government, though the work is being done under the direction of the department. This is the line which it is proposed to extend at a later date about 124 miles to the coast.

A common terminus at Manizales was made an unusual feature by the station design. An S plan enabled the station to parallel the railway and at the same time give entrance at the ends to cable tramways from opposite directions at right angles to the railway. The only possible location that would fulfill these requirements necessitated the complete removal of a hill containing approximately 260,000 cu.yd. of earth, all of which was used to fill the low places on the hillside. The removal was accomplished hydraulically, using a 100-hp. centrifugal pump situated on a river bank about 100 yd. below and about 275 yd. from the working level. The cost per cubic yard was less than 4c., compared with a cost of 35c. on a similar operation performed by hand and barrow.

S-SHAPED TERMINAL STATION AT MANIZALES
Ropeways from opposite directions enter ends of S, the body of which extends generally parallel to the railway siding



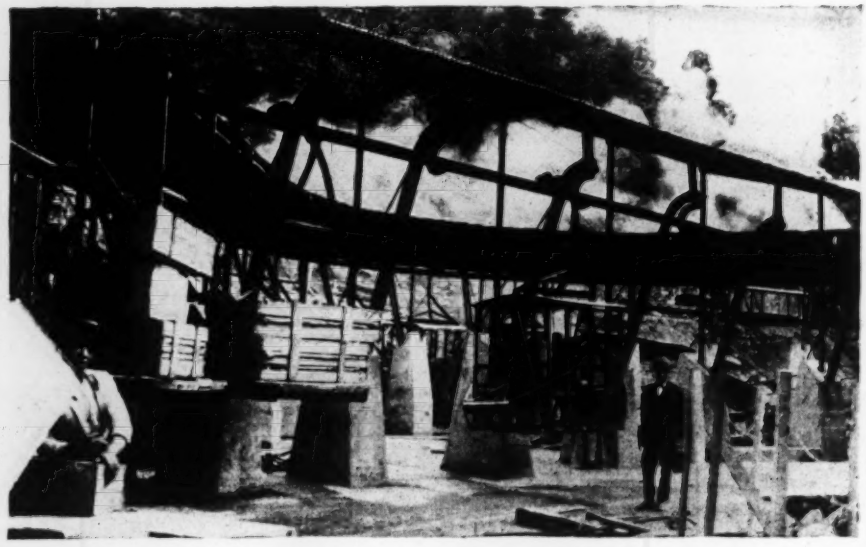
A PASSENGER CAR EN ROUTE

The station is of steel frame construction and when completed will have a total floor area of about 84,000 sq.ft., of which about 24,000 sq.ft. will be used for warehouse purposes and the remaining portion for power plant, car handling and repair shops. Both passenger and cargo cars within the station are handled on overhead rail and are propelled by hand.

A mono-cable type tramway was adopted. This consists of an endless moving rope supported throughout its length on steel sheaves which are carried on galvanized steel trestle towers. The power is transmitted from electric motors through belts and gears to a large driving drum around which the cable passes. The cable on the opposite end passes around a similar free-turning drum carried on a movable steel frame, which is held in the right position to maintain a proper cable tension by concrete counterweights.

The cars or carriers are attached to the cable by a saddle having a small projection which fits between the rope strands, being so designed as to pass freely over the sheaves. The saddle is attached to a cast frame which has on the opposite side a pair of small pulley wheels. When a car enters a station the rope drops below the level of a shunt rail system, which engages the pulleys and automatically disengages the car from the rope. When a car leaves a station this process is reversed.

Line Structure—It was required that the tramways should be capable of transporting passengers and not less than 20 tons per hour of cargo in both directions, individual loads of 1 ton, and live freight if necessary. To do this it was decided to use a steel wire cable of six seven-wire strands and a hemp core, with an operating speed of about 4½ miles per hour. As the ropeway was of considerable length, it was necessary to divide it into a number of sections, each with a power and tension unit. They were so arranged that the stations are situated in cargo centers and provide for the necessary line deflection angles. This made the average distance between stations nearly 4 miles.



LOADING FREIGHT AND PASSENGERS AT MANIZALES

To obtain rope gradients that would be within workable limits, it was necessary to provide towers of various heights. The plan adopted was to use a minimum of about 20 ft. and vary the heights in steps of 3 ft. up to a maximum of 220 ft. Loading conditions required towers of different strengths—one type, classed as ordinary, for moderate loads, and another type, classed as compound, for the heavier loads.

Mules distributed the material for the towers. The structures were supplied completely knocked down and all connections were made with field bolts. All structures were erected by native labor under competent direction. In order to reduce maintenance costs, all tower material was hot-dip galvanized.

Electric Operating Equipment—After considerable study of various systems of motive power, it was decided to electrify the Manizales-Aguadas system, which was first under construction. No ropeway of this size or type had ever before been operated electrically and the engineers had no actual installations to study and no established practice for their guide. The equipment is therefore original in selection and design.

There are six motor-operated stations on the system, in each of which a 100-hp. variable-speed motor drives the cable drum. Three single-phase transformers step down the transmitted voltage from 11,340 to 220. An 80-hp. diesel engine is installed in each station as a stand-by. Power is brought to these stations from a hydro-electric plant on the Guacaica River 310 miles from Manizales, directly in line with the right-of-way of the system.

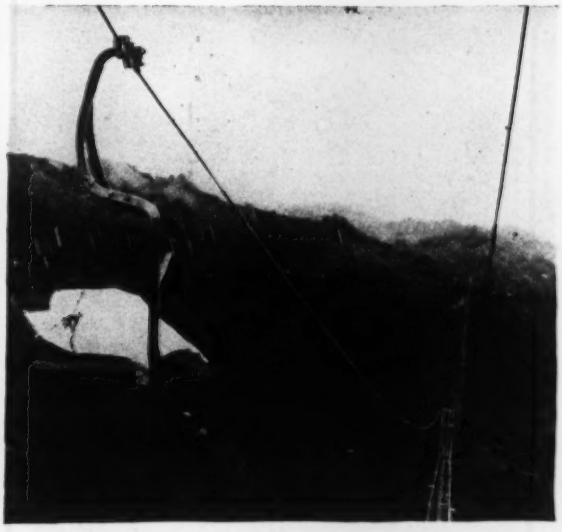
A head of 320 ft. was obtained with a pipe line of 400 ft., designed for a capacity of 1,200 hp., and a manifold arranged for five units of 300 hp. each, providing one spare unit. The initial installation consists of three turbines of 300 h.p. each, with a speed of 900 r.p.m. As additional protection, each turbine was equipped with bronze runners, guide vanes, renewable throat liners and shaft liners. Each machine is direct-connected to a 240-kva. 60-cycle 2,300-volt three-phase generator with direct-connected exciters. The station voltage is stepped up to 11,340 volts by six single-phase 100-kva. transformers.

For transmission of power to the various stations, it was decided to construct a separate line rather than attempt to carry the circuit on the towers. The transmission line consists of four conductors of No. 6 B. & S. aluminum steel-reinforced cable. The fourth wire is an emergency line and through a switching arrangement can be impressed into service in any or all sections over the entire system in case of failure of one of the other conductors or of line insulator trouble. The line is carried on 600 poles, using pin-type insulators.

Safety was a prime requisite, and in the matter of emergency braking an exhaustive study was made of all existing types of mechanical and electrical systems that held any promise of meeting the requirements. All had limitations that precluded their adoption. What was finally selected and has been successfully applied was a mechanical brake whose action is controlled by an ordinary oil-pressure governor such as is used with water turbines. A heavy brake pulley on the shaft is geared directly to the cable drum and is fitted with brake bands applied and released automatically through the rock shaft of the governor. A small auxiliary pulley on the same shaft operates the governor, and at the first tendency to overspeed the governor begins to apply pressure on the brake band. As normal speed is reached it closes and releases the tension of the brake band. The writer was able through the assistance of the Pelton Waterwheel Company's engineers to work out an arrangement that is ideal for this purpose.

Another Power Plant for Berlin

The city of Berlin is planning another electric power plant of 200,000-kw. capacity at a cost of 50,000,000 marks. One plant of the same capacity at Klingenberg was opened last year.



A FREIGHT CARRIER EN ROUTE

Cast-Iron Cores Used in Columns of 16-Story Concrete Building

Unusual Structural Features Employed in New Office Building for McGraw-Hill Company in Chicago

STRUCTURAL FEATURES of special character in the new 16-story McGraw-Hill Building, at Chicago, are composite concrete columns with solid cast-iron cores, wide beams of the same depth as the floor construction, and heavy girders for carrying offset columns.

The building is 100x125 ft. in plan (Fig. 2), but above the third floor the southwest corner is cut away to form a light court 54x32 ft. Small offsets occur at the 14th and 16th floors on the street fronts, and at the 7th, 11th and 14th floors on the alley side. Owing to the double-deck construction of Michigan Ave., the location of the building at Michigan and Grand Aves. gives the advantage of entrances at two levels. Its first floor and main entrance are level with the upper deck of the Michigan Ave. viaduct. Along the Grand Ave. side a 14-ft. steel-frame sidewalk is cantilevered from the building at this upper level, thus allowing the first-floor stores on this side to have a direct approach from Michigan Ave. In Fig. 3 is shown the concrete cantilever on the rear column of the building to support this sidewalk. The upper basement or ground floor is level with the lower deck of Michigan Ave. and with Grand Ave., an arrangement which gives a convenient side entrance from Grand Ave. to the ground floor.

FIG. 1—McGRAW-HILL BUILDING, CHICAGO

Elevators, stairways, service shaft and toilet rooms are all grouped in the center of the building as shown by the typical floor plan, Fig. 2. Thus all exterior space is available for office use, to be subdivided according to the requirements of tenants.

Foundations and Framing—The building is supported on groups of wood piles, 40 to 60 ft. long, driven through clay to hardpan and capped with concrete footings. In height and weight this building is about the maximum for pile foundations, greater height and weight requiring concrete piers sunk to hardpan or rock.

Owing to the grouping of service facilities at the middle of the building the column layout and framing plan are not symmetrical. In general, the interior lines of beams run lengthwise of the building. Transverse beams are used only in the central portion, the balance of the transverse framing consisting of floor joists monolithic with the floor slabs. A typical column offset detail is shown in Fig. 3.

Wind bracing was not a serious consideration, since the height of the building is only twice the least width. However, the spandrel beams on the west side, from the first to the seventh floor, were made 36 in. deep and upturned in order to take care of wind moment in the narrow direction of the court, as shown in Fig. 3.

Cored Concrete Columns—To conserve space the designers adopted a composite column known as the Emperger type, in which the use of a solid cast-iron core permits a relatively small cross-section. The core is supplemented by the usual vertical bars and spiral reinforcement.

Columns are uniformly 24x24 in. or 26x26 in. in section, except that those of the elevator group (Nos. 19, 20, 27 and 28) are 20x36 in. These sizes are continued unbroken from foundation to roof, the gradual reduction in required strength being made by reducing the core diameter and the amount of reinforcing steel. This uniformity in column section resulted in a material reduction in cost of formwork.

The cast-iron cores are solid cylinders in one-story lengths, having their ends chipped and roughly tooled and then milled so as to be truly square with the axis. Those in the lower floor are 11 in. in diameter, the size then reducing gradually to 3 in. for the top stories. In the concrete footings are embedded cast-iron stubs or short columns enlarged at the bottom to form flat bases or shoes, while the tops project to form seats for the first tier of cores. Dowel rods also project from the footings to receive the ends of the vertical reinforcing bars.

Each core extends 5 in. above the finished floor levels. For the joint (Fig. 3) a pipe sleeve is placed over the core, seated on the formwork and centered by four ¼-in. wires hooked over the top and inclined so that their lower ends bear against the face of the core. This sleeve is 10 in. long and from 1 to 2 in. greater in diameter than the core, the annular space being filled with cement grout to within 1 in. of the top of the core. When the column form and reinforcing steel for the next story had been placed, the sleeve was filled with grout and the next core was lowered into the form and carefully adjusted in the sleeve, all cement between the two cores, except for a very thin film, being squeezed out. The core was then plumbed and secured in position by tie wires, after which the concrete for the column was poured, special care being taken to prevent any displacement of the core. Forms were left in place generally for 14 days. A core being lowered into place is shown in Fig. 4, while Fig. 5 shows the top of a column form, with core and reinforcement.

The cores were specified to be of tough gray iron, such that 1-in. test bars 14 in. long, with a concen-

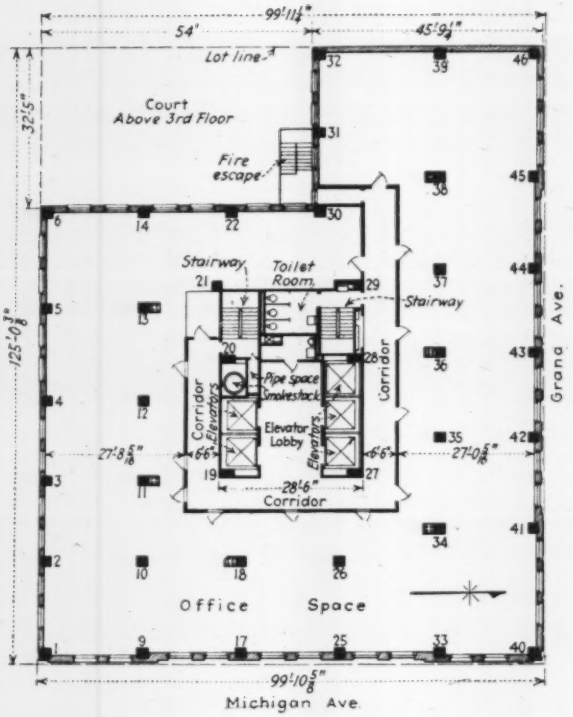


FIG. 2—TYPICAL FLOOR PLAN

trated load at the center of a 12-in. span, would not fail under less than 2,240 lb., corresponding to a bending stress of 40,000 lb. per square inch. Where the beams connect with the columns, the middle straight bars at the bottom of the beams have hooked ends which are placed just clear of the reinforcing spiral. The bent bars and the other straight bars continue through the column, as shown in the sleeve detail in Fig. 3.

Floor and Roof Construction—All floors are of the slab-and-joist type made with steel pan forms (Fig. 5) which are left in place. The live-load is 50 lb. for the office floors and 100 lb. for the lower and upper basement floors. In typical floors the joists are 5 in. thick, spaced 35 in. c. to c. and are 14½ in. deep, including the 2½-in. slab. Where the floor slab was finshed monolithically, its top was given a ½-in. layer of 1:2 cement grout, this being poured integrally with the slab and finished with steel trowels to a smooth and dense surface. It was then covered with 1 in. of damp sawdust for at least two weeks. Where tile or other flooring was to be laid on the concrete, this finish is omitted, the concrete being then surfaced with wood floats.

All floors in the rentable area are 14½ in. deep and all beams are of the same depth, thus affording a flush ceiling throughout. This arrangement is considered of special advantage for office building construction, as it gives the maximum flexibility for subdividing by partitions to suit changes of tenancy.

Similar slab and joist construction is used for the roof. Upon the roof slab is a fill of 1:8 cinder concrete dressed to drainage planes and covered with a 1-in. layer of 1:3 cement grout, floated to surface. This fill is separated from the parapet walls and other vertical surfaces by a 1-in. expansion joint, with filler. Upon the grout surface is felt roofing, covered with hot asphalft mopped in place. To prevent vibrations in the structure due to the operation of the elevator machinery, the concrete slabs which support the machines rest on brick piers built up from the pent-house floor. The piers are insulated from this floor with ¼-in. sheet lead.

Where plastered ceilings are placed directly below the floor joists, the forms for the joists are inverted troughs or pans of corrugated sheet iron. The bottoms of the pans are closed with perforated plates of copper-bearing steel, to which the plastering is applied. Suspended ceilings have a framing of light channels suspended from the joists by hangers embedded in the concrete.

Exterior Surface—Polished dark granite from Minnesota is used for the exterior facing of the first story, above which is buff limestone with spandrel facings and decorative work of artificial cast stone. Below the upper level of Michigan Ave. the facing is of dark paving brick.

Construction Methods and Plant—Two material hoists and a concrete hoist, all with steel towers, were located in the light court. As soon as concreting was finished, the hoisting bucket was replaced with a cage, the use of three hoists then assisting considerably in the prompt handling of materials, while the location of these hoists outside of the building instead of in the elevator shafts avoided all interference with the elevator contractor. In addition there was a skid hoist on the Grand Ave. side, for handling long material such as reinforcing steel and

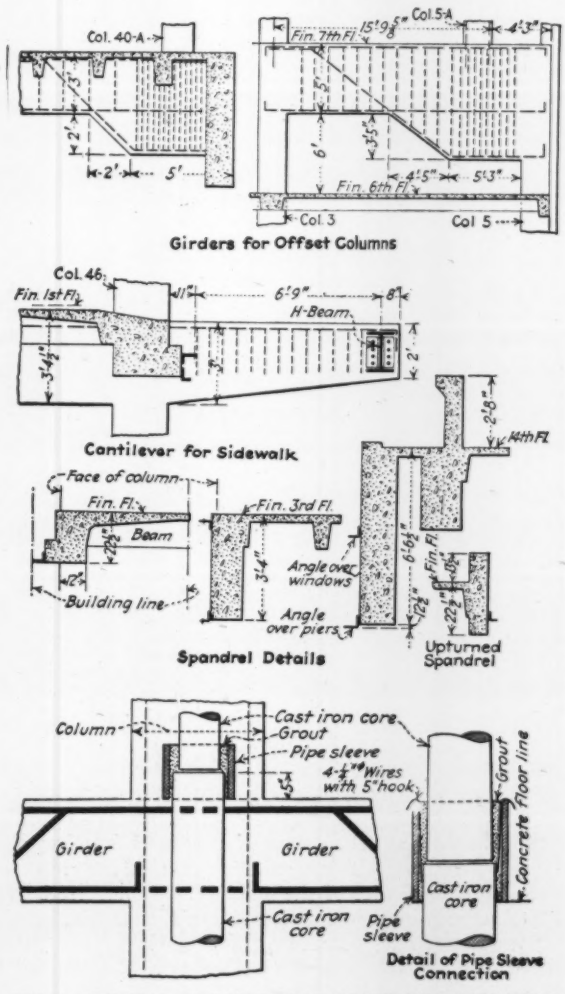


FIG. 3—SPECIAL DETAILS IN McGRAW-HILL BUILDING

form lumber. A ginpole derrick was used for setting the cast-iron cores and reinforcing steel in the column forms. A ¾-yd. mixer delivered ⅝-yd. batches to the elevator bucket, which discharged the concrete into a steel hopper on the working floor, for loading buggies which placed the concrete in the forms.

Cement, limestone and sand for the concrete were delivered daily, as required, by motor trucks, only enough material being kept at night for starting work in the morning. This arrangement was more satisfactory than keeping large stock-piles, especially in view of the winter weather and limited space available. It also provided for the use of fresh material, with inspection of each load, and avoided storage of large quantities of empty cement sacks.

Much of the construction was done during long spells of severe cold, some of the concrete being placed when the outside temperature was 8 deg. below zero. Hot water for the concrete was supplied from boilers and the stock-piles were heated by steam from perforated pipes, these piles being covered with canvas at night. In some places quick-hardening cement was used during very cold weather, though this added to the cost. For the slabs carrying the elevator machinery, this use of special cement enabled the machinery to be placed 24 hours after the concrete had been poured.

The working floor and floor below were thoroughly inclosed with canvas, and a temperature of 60 to 70 deg. was maintained by the use of salamanders spaced to serve about 100 sq.ft. each. A thermometer was hung in every bay. As soon as the outer walls reached the floors, the windows were glazed and temporary steam pipes laid, thus keeping the building warm and dry for the interior work.

The piling, concrete, cement-finished flooring, masonry and carpentry were all handled by the general contractor with his own forces, thus enabling the work to be scheduled and pushed rapidly, without the complication of subcontractors' forces.

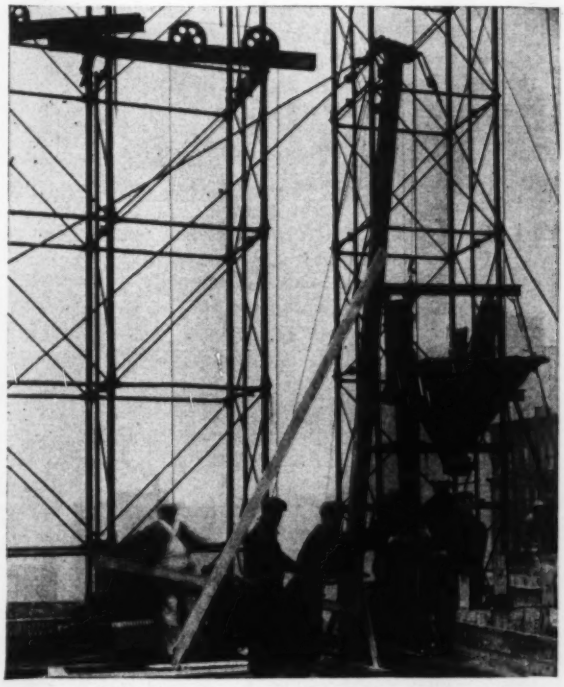


FIG. 4—SETTING COLUMN CORE IN FORM

FIG. 5—COLUMN REINFORCEMENT
Shows top of cast-iron core, vertical bars and spiral. Also bars for girder. The corrugated steel pans are the forms for slab-and-joist floor.

Engineers and Builders—The McGraw-Hill Building was designed by Thielbar & Mugard, architects, the structural engineering design being prepared by James B. Black, consulting engineer. The general contract was let to the Dilks Construction Company, Chicago, and the work was done under the direction of Daniel Crumlish, general superintendent. The first pile was driven Sept. 4, 1928. Concrete work was started Oct. 3, 1928, and was completed March 1, 1929. Tenants moved in on May 1.

Loading Space Within Buildings Advised

Consideration of the street traffic problem in New York by a special committee has led to recommendations to city officials by the Merchants Association of New York City that the practice of backing trucks to the curb at such an angle as to obstruct street and sidewalk traffic should be forbidden. The committee's report recognizes the fact that some means for loading and unloading goods in the business district is essential, but states that, since a general program of street widening is impracticable, the alternative of reducing the amount of loading done on the street must be adopted in principle. Stopping the practice of end loading would permit more rapid flow of traffic through the streets but would do little to reduce sidewalk obstruction. This can be eliminated only by the provision of loading space within the building line. The report states that, while legal requirements of this nature should be adopted only after most careful study, self-interest as well as the public need will best be served by providing loading space within new business buildings.

High Multiple Arch Dam Declared Safe Except From Earthquake

Lake Hodges Dam Adequate for Static Loads—Present Buttress Cracks Not Serious—Improved Spillway Advised

"STRUCTURALLY safe except in case of major earthquake shocks or overtopping," is the verdict on the Lake Hodges multiple arch dam near San Diego, Calif., set forth in the report of a board of consulting engineers appointed by the state engineer of California. The board, consisting of F. C. Herrmann, B. A. Etcheverry and A. Kempkey, specifically recommends improvement of the spillway to discharge safely the maximum predicted flood flows to prevent overtopping the remainder of the structure.

The appointment of the board was the result of a request from the San Diego board of supervisors made when residents below the dam became alarmed at reports that it was endangered by cracks in the buttresses, extending in some cases from the arch to near the foundation.

The dam, now ten years old, was described in *Engineering News-Record*, April 10, 1919, p. 720, at the time of its completion. It consists of a multiple arch non-overflow section 390 ft. long, with a maximum height of 133 ft. and a spillway section 360 ft. long formed by 175 ft. of ogee rollway over the north seven buttresses and 185 ft. of spillway excavated from the solid rock. Buttresses are spaced 24 ft. on centers and are unreinforced except where arches, strut beams and footwalks are tied in. Their thickness is 18 in. for the upper 47 ft., increasing to 4 ft. at the base of the highest buttress. The findings of the consulting board are outlined in the following:

The foundation rock in general may be considered satisfactory, the records showing clearly that each buttress was carried into bedrock with care; the foundation pressures are not excessive. The buttresses considered as walls are not excessively stressed, but considered as columns their direct stresses would be increased by an amount which is subject to assumption and conjecture. "Modern practice would require that the buttresses be adequately reinforced and braced. We believe, however, that the buttresses will continue to carry the loads provided the structure is not subjected to the shocks incident to an earthquake of major intensity or that resulting from overtopping."

Cracks in the buttresses extend upward from the roof of the gallery passageway toward and normal to the arch rings and also vertically down from the passageway toward the foundation. With one exception they end before reaching either the arch or the foundation. Frequent micrometer measurements of the changes in widths of these cracks have been taken since October, 1922, and indicate maximum width during the winter and minimum width during the late summer, there being a small gradual increase in the width annually. Study indicates that the cracks could not have been caused by load stresses but are the result of expansion and contraction together with setting shrinkage. The presence of the cracks in their existing condition does not materially affect the stability of the buttresses with the reservoir full to the crest of the dam.

Detailed analysis of the stresses in the arch rings indicates that the reinforcing is adequate and that the arches are safe. An analysis of stresses in the structural units likely to be induced by a major earthquake shock, prepared by H. D. Dewell, indicates that the existing bracing probably would be torn out. To resist a major earthquake the buttresses should be braced crosswise of the stream by ties made capable of resisting bending stresses.

The spillway, in its present condition, is barely sufficient to discharge the maximum flood of record and it is recommended that further excavation be made, both above and below the spillway proper, to remove channel restrictions and thereby increase the spillway capacity.

Graveling Roads at Low Cost in North Carolina

Gravel With Oversize Stone Crushed on the Road Being Put Down at Cost of $600 to $1,110 a Mile

USING simple hand tools, a small portable crushing outfit traveling along the work and two power shovels light-traffic roads of the state highway system are gravel surfaced in the mountains of western North Carolina at a cost of from $900 to $1,100 a mile.

The methods used have been developed over a period of years by H. E. Noell, engineer of the eighth district of the North Carolina State Highway Department. Confronted by insistent demands for an all-weather surface on roads carrying light traffic, and with properly limited funds, Mr. Noell could not afford much plant expense. Commercial sources of gravel or other ballast materials within the range of the money available did not exist. It was thus a case of making the local materials do at minimum cost.

No glacial gravel exists in this section. There are here and there fairly satisfactory small deposits of stream gravel. The material in these deposits lacks uniformity but is such that it produces good results with the methods followed.

The gravel is excavated and loaded into motor trucks by the power shovel. The trucks deliver the run-of-the-pit directly to the shaped-up road surface, without selection or screening. At the point of the road where the trucks dump their loads men with hand potato rakes pull to the ditch lines all of the stones that will not pass a 2-in. ring. The larger stones, some of which are full one-man size, are thrown to the side by hand.

As soon as practicable after placing the gravel on the road, a portable crushing outfit is moved along to reduce the stones pulled to the sides. The output of this crusher is spread evenly by hand with shovels. No rolling is done, the traffic being allowed to consolidate the first layer of gravel and afterward the top dressing of crushed stone.

Two power shovels are in service, one a ¼-yd. and the other a ⅓-yd. machine. The ¼-yd. size has been found best. Mr. Noell considers that a larger machine would lack the portability necessitated by the frequent rather long moves required. The shovels are shifted from pit to pit on a standard 5-ton motor truck. When operating in the pit the crawler mounting permits the shovel to work under any conditions where it can be reached

by the trucks. In fact, these shovels frequently run in water up to 18 in. deep, with the trucks on roadways built up or left on the dry.

The number of trucks used depends on the length of haul. Mr. Noell has found that light six-cylinder dump trucks are best for this service. He also has found after considerable experience that he can rent trucks for less than it would cost if the department owned them. Moreover, there has been no difficulty in getting an ample number of trucks at $10 for a ten-hour day. On each job the rating of the number of loads comprising a day is made and a truck must make that number to get a day's pay. All delays of more than 30 minutes for any reason are deducted from the pay of the trucks.

The number of men used in raking and casting out large stones at the point where trucks dump on the road varies somewhat with the portion of the gravel that has to be removed in this way. The crew usually can spread the loads and separate the gravel as fast as it is delivered. Occasionally they fall behind. When that happens, a lull in the arrival of trucks permits them to go back and finish separation on passed over stretches.

The portable crushing outfit consists of a jaw crusher mounted with a gas engine on a special undercut four-wheel steel-frame truck. This outfit is pulled along the road by a light tractor. A truck has been found unsatisfactory for heavy grades. When in operation the crushing outfit proceeds along one side of the road, leaving the other side open for traffic. The windrowed stones are raked and forked from the ditch lines by hand, to avoid mixing soil with them. The stones are then thrown by hand to the charging platform of the crusher. A potato fork is used to handle the smaller sizes, but the largest ones are lifted by hand.

Two men working directly back of the crusher spread the reduced material as fast as it is discharged. These men acquire considerable skill in roughly building shoulders and in accurate spreading of the thin layer of crushed gravel.

With a crew of eight men and a foreman this portable crushing outfit in ten hours puts the top dressing of crushed gravel on from 700 to 1,000 ft. of road averaging about 16 ft. in width. The depth of this crushed material top dressing runs from 1 to 2 in., depending on the portion of coarse gravel in the deposit. The total depth of gravel surfacing ranges from 5 to 8 in., according to the character of the subgrade.

For two or three weeks after the top dressing of the crushed gravel is added, the road is scraped with a leaning-wheel blade grader, drawn by a motor truck. Smoothing with a road drag is entirely avoided, since experience shows that the blading gets much better results.

Upward of 47 miles of secondary mountain roads has been surfaced, some being in use after three years' service. All of it forms an excellent progressive step in surfacing, with bituminous treatment taking hold in good fashion when added later.

METHOD OF GRAVELING LIGHT-TRAFFIC ROADS, EIGHTH DISTRICT, NORTH CAROLINA

1—Hand-raking large stones from run-of-pit gravel to the ditch lines of the road.

2—Raking the large stones out of the ditch line to feed to the traveling crusher.

3—Distributing run of crusher to the road surface. Second man from the right is throwing larger stones into the crusher.

4—Typical section of completed road after a few weeks in service.

FIG. 1—Newark Bay Bridge Lift Span in Water After Erection Falsework Collapsed

Raising 322-Ft. Lift Span From Bottom of Bay

Details of Jacking Operations Used in Recovering Heavy Span of New Newark Bay Bridge Dropped Into Water by Falsework Failure During High Wind

A 322-FT. double-track vertical lift span weighing more than 1,500 tons, built for the combined Lehigh Valley - Pennsylvania Railroad bridge across Newark Bay, which fell from its erection falsework into the bay during a high wind on April 1, has been recovered and placed in final position in the bridge. Failure of the falsework was noted in *Engineering News-Record*, April 4, 1929, p. 566, and final placing of the span was recorded in this journal in the issue of July 11, 1929, p. 73.

The span consists of two camel-back riveted trusses spaced 33 ft. apart and divided into ten equal panels of 32 ft. 3 in. At each corner of the span is a vertical post which connects to the lifting girders and cables hanging from the towers. An A-frame cable bent weighing 26 tons surmounts the span at the center. The span was built on erection falsework adjacent to the bridge site, whence it was to be floated into place and attached to the counterweight cables at the bridge. The accident occurred when the span was just completed and almost ready to be floated to place; the bottom chord had been riveted up, but most of the other connections were not as yet completely bolted.

The erection falsework consisted of eight towers of fifteen 60-ft. piles each, cut off about 9 ft. above mean water (Fig. 2). As the span weighed approximately 1,500 tons, each pile carried about 12½ tons.

Failure of the falsework occurred between 9 and 10 p.m. during a storm with a wind velocity estimated at 70 to 80 miles per hour. As no one was on or near the structure, no details as to just what happened are available. All of the piles were found to be broken off at the mud line. A reasonable inference is that the excessive wind pressures and high wave action racked the structure in such a manner as to cause the piles to break off. The span went down almost vertically with little lateral movement, and came to rest in a tilted position with one corner some 8 ft. higher than the diagonal corner. No damage was done to the steelwork except that the cable bent broke loose, carrying out several top chord laterals and one floor stringer in falling. The span resting on the bottom is shown in Fig. 1.

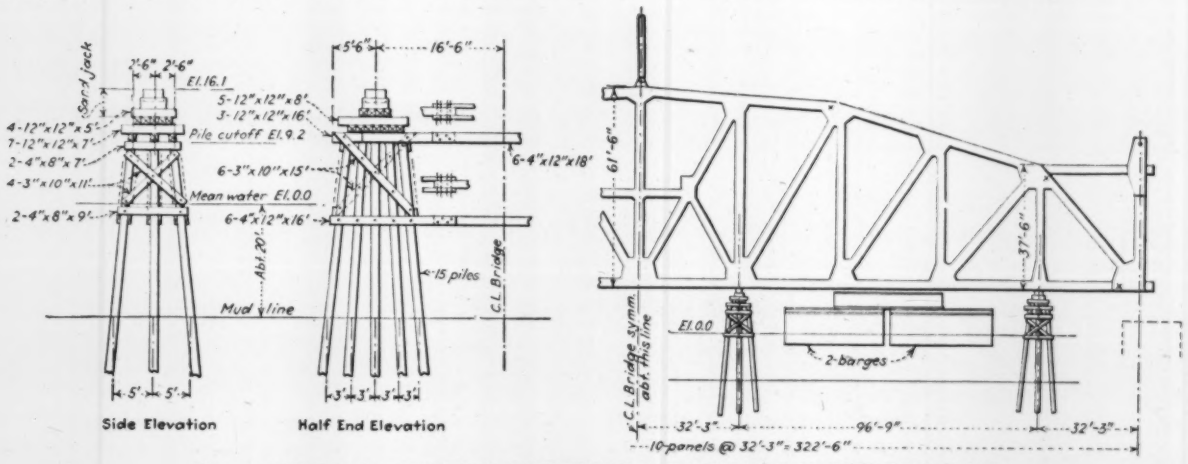


FIG. 2—DESIGN OF ERECTION FALSEWORK, NEWARK BAY BRIDGE LIFT SPAN

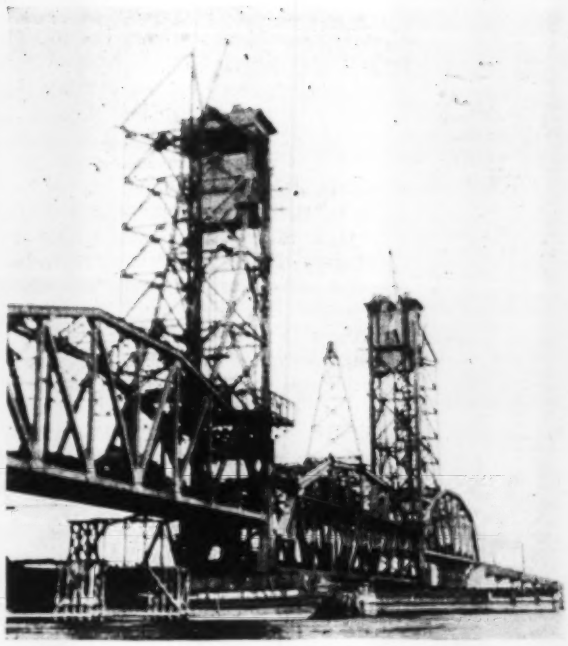


FIG. 3—LIFT SPAN, AFTER RECOVERY, READY FOR RAISING TO TOP OF TOWERS

The span was raised from the bottom to a position ready for transferring to barges on June 24, and was floated to its location in the bridge on July 8. The methods used in raising the submerged span were most ingenious and interesting.

Lifting Arrangements—The lifting operation consisted essentially of jacking up the span from four pile- and frame-bent towers, one at each corner, by means of hangers fastened to the trusses through two sets of overhanging steel girders placed parallel to the end floorbeams and bolted to the end lifting posts of the span.

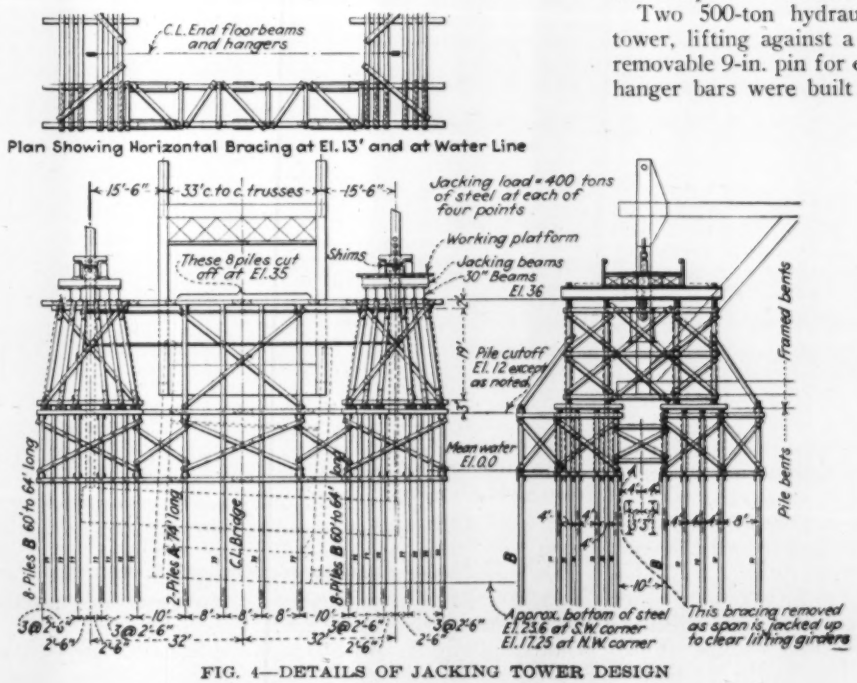

C.L. End floorbeams and hangers
Plan Showing Horizontal Bracing at El. 13' and at Water Line
15'-6"
33' c. to c. trusses
15'-6"
Jacking load = 400 tons of steel at each of four points
Working platform
Shims
These 8 piles cut off at El. 35
Jacking beams 30" Beams El. 36
Pile cutoff El. 12 except as noted
framed bents
Mean water El. 0.0
Pile bents
8-Piles B 60' to 64' long
2-Piles A 78' long
C.L. Bridge
8-Piles B 60' to 64' long
Approx. bottom of steel El. 23.6 at S.W. corner El. 17.25 at N.W. corner
This bracing removed as span is jacked up to clear lifting girders

FIG. 4—DETAILS OF JACKING TOWER DESIGN

At each corner of the span 64 piles, 60 ft. long, were driven to permit the raising of the lifting girders without interference. These piles were cut off at El. 12 and capped with a grillage of 12x12-in. and 10x12-in. timbers. Upon these grillages were erected towers of framed bents, extending to El. 36. In addition to the load piles, 48 bracing piles were driven to stiffen the falsework structure. The piles in the new falsework carried a load of about 8 tons each.

Resting on each of the four framed towers were six 30-in. 200-lb. I-beams 33 ft. long, set parallel to the center line of the span and connected with short sections of 24-in. I-beams, forming a single layer of grillage. Above this grillage were set the jacking beams, upon which the jacks rested, each beam made up of two 8x24-in. machined steel slabs 13 ft. 3 in. long set on edge and separated by three short sections of 5x24-in. steel slabs 2 ft. 11 in. long.

Each of the lifting members, fastened crosswise to the ends of the truss, consisted of two heavy 84-in. plate

FIG. 5—FALSEWORK READY FOR RAISING SPAN

girders framed on 5-ft. centers, connected by eight diaphragm plates, one at each end, to which the hanger bars were attached, two placed on either side of the end posts of the span and two near the center. These girders, detailed in Fig. 6, overhung the trusses 15½ ft., so as to bring the lifting bars central to the falsework tower. A heavy plate and I-beam detail was bolted to the end posts to furnish a bearing for the lifting girders.

Two 500-ton hydraulic jacks were placed on each tower, lifting against a special forging which carried a removable 9-in. pin for engaging the hanger bars. These hanger bars were built up of four 26x1-in. steel bars, stitch riveted. Two of the hangers were 47 ft. 1½ in. long and two were 53 ft. 3½ in. long, the difference being due to the tilted position of the span. At the lower end the hangers were connected by a 9-in. pin to a universal-joint forging pinned to the outer diaphragms on the lifting girders. As detailed in Fig. 6, a series of $9\frac{1}{16}$-in. pinholes were drilled on 18-in. centers almost the entire length of the hangers to be used in the successive jacking operations.

Jacking—The jacking procedure consisted of fastening one end of the hangers to the lifting girders and the other to the special forgings placed over the jacks.

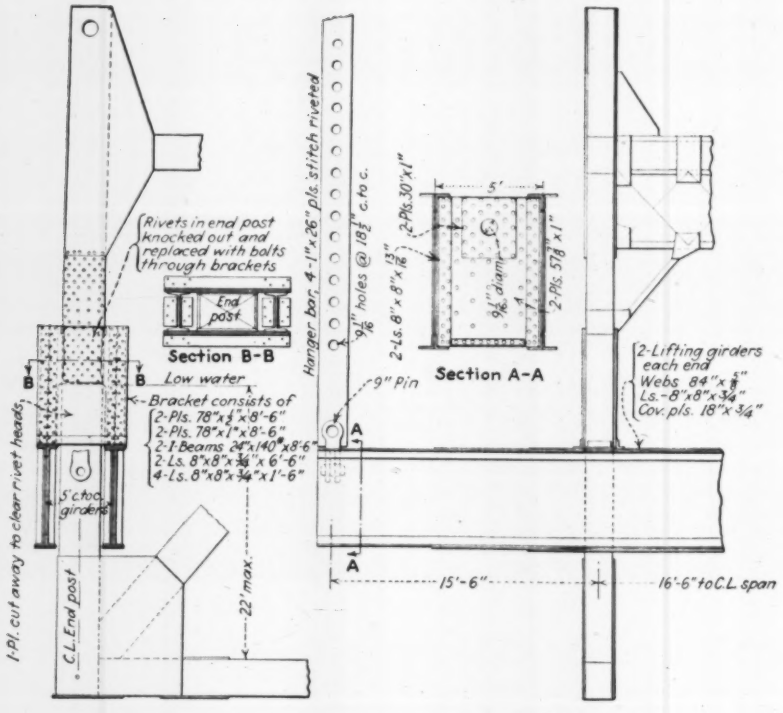


FIG. 6—DETAILS OF LIFTING HANGER ARRANGEMENT

The jacks were then raised 18 in. until the second succeeding hole in the hanger could be caught by a 9-in. pin resting on a bearing block placed between the jacks. This lower pin held the hangers until the jacks and forging could be lowered and the lifting pin placed in the next hole in the hanger. The first operations were to level up the span, after which all four sets of jacks operated simultaneously. Each 18-in. lift took seven to eight minutes, with about 30 minutes' delay between lifts. The span was raised clear of the water in about ten hours' time. The portion of the hangers rising above the jacking assembly during the lifting operations was burned off in successive lengths, as convenient.

While the steelwork of the span was found to be practically undamaged, every member was completely covered with barnacles, accumulated during the two months' submersion. Removing these barnacles proved to be very difficult, especially on the inside of the box members. The use of grinding machines fitted with stiff rotary wire brushes proved to be only partly successful. Hand scraping was found to be slow and tedious and on the whole unsatisfactory. The most effective method of removing these barnacles was by using long-handled scrubbing brushes with fresh water, caustic soda and washing powder.

Final Placing—The span was left suspended from the towers until ready to place in final position on the bridge. The new bridge is adjacent to an old timber trestle containing a steam-operated swing span with side and center fender systems extending into the area occupied by the new lift span. Four barges in groups of two were fitted with timber and steel cribbings and placed under the span, the load being transferred to the barges by the jacking system assisted by a rising tide. The hangers were then removed and three days later the span was floated into place during a rising tide by using three tugs. Careful maneuvering was necessary because of the limited clearance offered to the barges by the old timber fender system. The span was landed on jacks cribbed up from the top of the tower piers.

Arrangements had been made to lift the span to a clear height to pass navigation by lowering the counterweights. The counterweights had been built suspended from bars at the top of the towers with just enough concrete to overbalance the weight of the span in the condition when landed —that is, minus the track and deck material. After the span was landed the counterweight cables were attached through the permanent lifting girders to the lifting posts, and before the counterweights were released about 25 tons of concrete adjustment blocks was placed on each end of the span to balance the counterweights, from which all adjustment blocks had been omitted. The counterweights were then released and the span was lifted to the fully open position by two derricks on the towers which had been used in the tower erection, each derrick lifting approximately 5 tons.

The work of completing the span will be done while it is in the high position, 125 ft. above high water, so as not to obstruct navigation.

Fabrication and erection of the lift span, towers, two adjacent truss spans and part of the plate girder spans comprising the entire structure was done by the Bethlehem Steel Company, of Bethlehem, Pa.

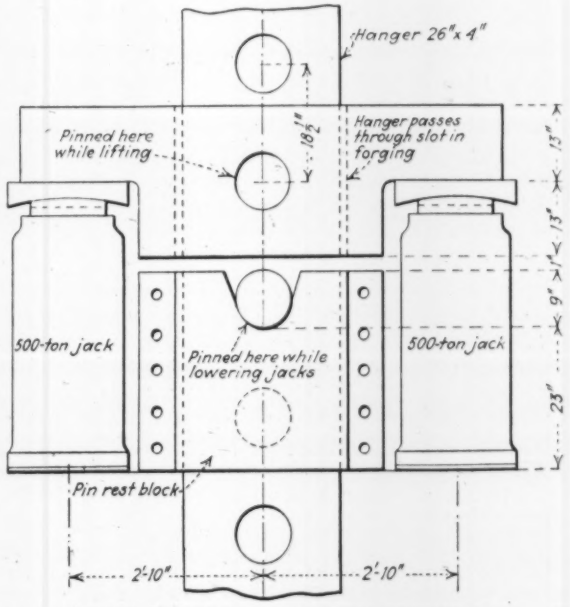


FIG. 7—DETAILS OF JACKING ASSEMBLY
Jacks, shown in closed position, raised 18½ in. per lift.

New Salvador-Guatemala Railway Completed

An 80-mile railway between Salvador and Guatemala, which places Salvador in much closer contact with the markets of the United States, has just been completed, at a cost of approximately $12,000,000.

Proposal to Turn Unreserved Public Lands to State Control

Secretary Wilbur Reveals New Plan for Soil and Water Resources—Forest and Mineral Lands and Reserved Domain Not Affected

Special Washington Correspondence

ONE of the greatest land transfers in American history would result from Secretary Wilbur's proposal to turn over the unreserved public domain to state jurisdiction. Mr. Wilbur revealed his stand in a speech in Boise, Idaho, on July 9. The huge area affected is scattered through the Pacific Coast and Rocky Mountain regions, and is as large as all New England, New York, Pennsylvania and the Atlantic seaboard states down to and including North Carolina. For years past each successive Congress has seen a bill to the same effect tabled in committee, but this is the first approach from an executive source. The newly energized Interior Department thus takes a new position of importance in Western affairs. Also, the form which the proposed change has taken doubtless reflects not only the opinion of one Cabinet officer with a sympathetic understanding of Western conditions but also a very definite desire on the part of some of the states most concerned to take problems into their own hands rather than to await benefits forthcoming in slow doles from a paternalistic government in Washington.

Types of Land Affected—What Secretary Wilbur proposes is that the states be enabled to handle their own problems in the conservation of soil and water resources—that all unreserved lands in the territorial limits of the United States be transferred to state authority. Indian reservations, national parks and monuments are, of course, out of the discussion. While Mr. Wilbur foresees that forest and mineral reserves may eventually pass to the states, no immediate change in their status is advocated. Government power site land presumably would be retained also. Referring to the soil and water resources, the Secretary of the Interior Department calls attention to overgrazing and deforestation, which with their effect on runoff, rainfall and soil erosion have reduced large areas to virtual desert. Also, says he, "the states of the West are water conscious and they can more readily build up those wise water conservation measures upon which their very life depends than can the distant Washington government."

Agriculture Main Issue—There are approximately 194 million acres of unreserved lands. Nevada includes more than double any other state with 54 million. Next come Utah with 26 million, California with 20, Arizona and Wyoming with 18 each, New Mexico with 17 million and so on through the list of Western States. Though not unexplored, a quarter of this area is wholly unsurveyed. Much of the rest is mapped only by rough plats which in many cases are far from accurate. As for an outline of natural resources, none exists. The Interior Department does not know yet how much tillable and grazable land lies in the public domain and has only recently attempted to work out an estimate. Due to this vagueness, Mr. Wilbur has not committed himself to a definite plan but has stated his proposition as something which will have to be worked out. However, with mineral and forest reserves and important water-power resources out of the scheme, the main issue narrows to agriculture, which will be the outstanding political and economic element in any action to follow, regardless of any moral or legal ideas which may be introduced.

Some Objections—It is possible only to speculate on consequences which would follow the adoption of Secretary Wilbur's proposal. Some of them might be: an increase in agricultural production which would prove harmful to present reclaimed areas; a return to such state control as was made notorious and scandalous by the Yazoo and Texas land steals; a general condition of failure such as has characterized many state and private projects under the Cary and Smith acts; a situation which would make way for spoilers now checked by firm hands reaching out from Washington; a repetition of previous history where the inability of the Western States to agree on matters of joint concern was a common characteristic.

All these objections do not, of course, render the transfer of the public domain impossible. Mr. Wilbur has named or hinted at most of these contingencies and so is unlikely to proceed with his proposal until he has devised safeguards against unwise local action.

Reaction in the Interior Department is hard to gage, since the Secretary apparently has not discussed his plans openly. The status of the various bureaus, however, should not be much affected by the proposal. The Bureau of Reclamation has been holding off against too rapid project building but has enough work in hand to keep its forces occupied for some years. The General Land Office will have plenty to do before and after any such transfer in settling the boundaries of the old railroad grants and getting all other claims out of the way. Other bureaus, the Indian Service and the Geological Survey under the Department of the Interior and the Forest Service and the Bureau of Public Roads under the Department of Agriculture would maintain their present Western activities.

Future Turns of Events—The political line-up on the issue of land transfer is as yet uncertain. Opposition will be heard from the Middle West, which fears agricultural competition, and even from some of the Western States. In other Western quarters there already seem to be signs of active support of Mr. Wilbur's proposal. Conferences are pending at which the question would be a major topic. In Salt Lake City on Aug. 26 a meeting of state executives is planned to set up an organization of Western States. Six Governors are said to be in accord. Press intimation has been given of a later conference at Atlantic City between Governors and the President. These events should serve to keep the issue from falling back into oblivion at least.

Insect Larvæ Reduce Water Conduit Capacity

Accumulation of Caddis fly larvæ on the walls of flumes and tunnels carrying water to certain hydroelectric plants of the Southern California Edison Company causes such a serious decrease in the capacity of the conduits that annual removal is necessary. The larvæ form a slimy coating that is reported to reduce the capacity of a 620-sec.-ft. conduit as much as 40 sec.-ft. Cleaning of the larger size conduits requires shutting off the flow to permit workmen to scrape off the deposit. Smaller pipe lines are successfully cleaned by forcing oak brush balls through the pipe by water pressure.

Tunnel Repaired With Precast Concrete Invert Beams

Special Equipment Handled Repair Work at Night in French Railway Tunnel Which Was Damaged by Floods

TUNNEL repair and reinforcement of an exceptional character have been carried out under heavy traffic by the Paris & Orleans Railway, France, on its approach to the Quai d'Orsay terminal station in Paris. This terminal line, opened in 1900, runs along the bank of the River Seine in a double-track tunnel about 26 ft. 3 in. wide. For the length on which the repair work was required, one side of the tunnel encroached upon an old abandoned sewer, necessitating masonry reinforcement

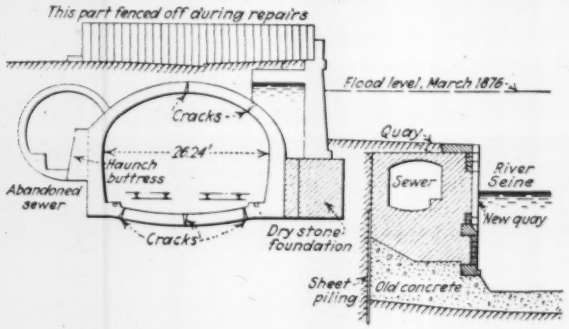


FIG. 1—QUAI D'ORSAY TUNNEL IN PARIS

at the haunch of the arch. On the other side it encroached upon the buttresses of a riverfront retaining wall, the buttresses being cut away to make room for the tunnel arch. These conditions are shown in Fig. 1. A new sewer runs under the quay or wharf along the river, and at this point the riverbed is covered with a 3-ft. layer of concrete, the floor of an old lock removed in 1925. The following description is condensed from an article in the *Revue Generale des Chemins de Fer* by M. Blondel, chief engineer of maintenance, Paris & Orleans Railway.

Cracks discovered in the roof and invert of the tunnel in 1926 are indicated in Fig. 1. The arch roof, 1.8 ft. thick, had one at the center and one near the haunch on the river side. The invert, 1.6 ft. thick, had cracked at the center and on each side, lifting at the middle so as to raise the inner rail of each track. There was a deflection in the roof and a slight spreading of the side walls, particularly the wall nearest the river. On an adjacent stretch of the tunnel a roof crack occurred after the great flood of 1910 and the roof was strengthened by counterforts on the outside. But on the part cracked in 1926 this reinforcement had not been considered necessary. However, the invert had been strengthened with a lining of steel plate and concrete to prevent excessive seepage. This alteration had made it necessary to remove the ballast and lay the tracks directly upon the concrete floor, in order to maintain the normal headroom.

For the first step in repairs, as the tracks were laid on the concrete, it was necessary partly to demolish this in order to restore the tracks to proper surface and take out their incorrect transverse inclination. This was done at night and in the intervals between trains. Cement grout was injected below the invert to fill the voids in the soil and was injected also into the dry stone foundation upon which the river wall was built. The tunnel is partly in filled ground and partly in a 16-ft. stratum of sand, the upper part of which is clayey and wet. There were at least 200 trains daily, and only for four or five hours at night could one track be closed to traffic.

While this preliminary work was in progress methods were considered for permanent reinforcement, which had to be carried out before the autumn floods should saturate the ground and cause a dangerous condition. Owing to the settlement of the roof, it was necessary to put the new invert at a lower elevation, in order to obtain the necessary headroom for an overhead catenary and trolley wire system to replace the original third-rail conductors. One plan proposed was to form a series of sheeted transverse drifts under the invert and in them to place the foundations for the new invert, but the difficulties of draining drifts in such wet ground were too great to attempt this plan.

In the method adopted it was decided to abandon the idea of a curved invert, in view of the upward pressures, and to substitute for it a series of reinforced-concrete cross-girders of I-section, with heavy concrete slabs between the girder webs. Further, in view of the wet ground and difficulties of drainage, it was considered desirable to use precast girders, which could be transported and set in place. The girders are 23 ft. long and 32 in. deep, with the top flat and the bottom curved. They are of I-section, spaced 4½ ft. c. to c., and have flat slabs between their webs. A novel feature of the plan was the method of supporting the roof arch at its springing line by means of curved posts or columns seated on the bev-

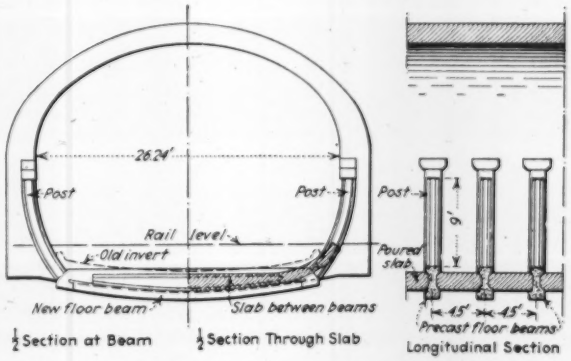


FIG. 2—SYSTEM OF TUNNEL REPAIRS
New invert girders carry curved posts to support roof arch. Flat slabs between girders.

eled ends of the invert girders. These also were precast members and were of octagonal section, 13 in. in diameter, curved to the outline of the side walls of the tunnel so as to be set in recesses cut in these walls. In this way the walls would be freed from the arch thrust. The general system of this repair or reconstruction work is shown by Fig. 2.

For carrying out this work, the general program was as follows: Trenches about 6½ ft. wide and 11½ ft. apart were cut across the old invert; in each of these was placed a pair of precast girders and concrete was poured between them for a slab floor. Meanwhile the tracks were supported by I-beams resting on the undisturbed parts of the invert. With the first set of girders in place throughout the length of the repair work, the tracks were supported by blocking on these strips of new invert, so as to bridge the alternating 11½-ft. stretches of

old invert. These latter could then be removed, two girders being laid and slabs placed between them and also between the first and second sets of girders. In this way the tracks were kept in condition for use except during the actual working hours at night.

For the difficult work of transporting and placing the cumbersome 4-ton invert girders in the restricted space within the tunnel two special work trains were assembled each consisting of two eight-wheel flat cars spaced 25 ft. apart in the clear and each having across the floor a steel girder directly over the inner truck. Upon these girders was pivoted a frame composed of two 12-in. H-beams 40 ft. long and 7½ ft. apart connected by struts. One car carried a concrete mixer and both carried cement and gravel. At first an air compressor was also carried, to serve the pneumatic tools, but it was found more convenient to make hose connections with compressed-air power mains near the tunnel. Two ship's davits mounted on the long frame carried chain hoists, from which was suspended one of the new concrete invert girders, about 23 ft. long. Attached to each end of the girder was a bridle, with cable leading to a hand hoist or winch on the end of the long pivoted frame. This arrangement is shown in Fig. 3.

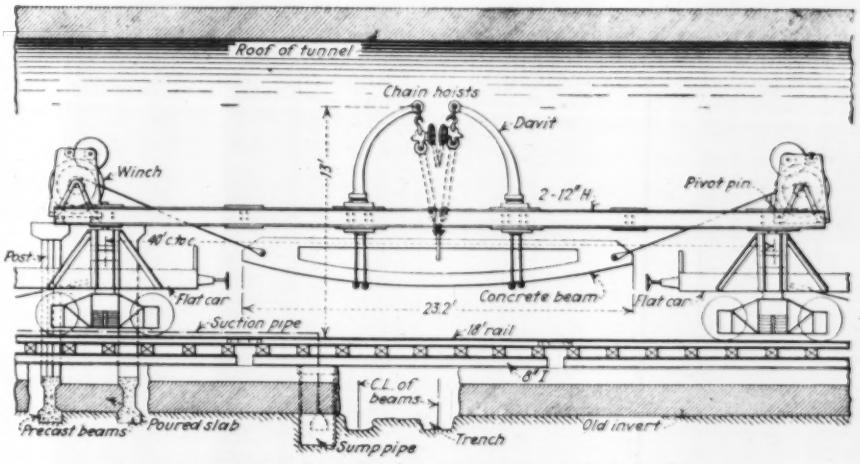


FIG. 3—WORK TRAIN DELIVERING INVERT BEAMS

Two trains side by side, on double track, each carrying one beam. Trench cut in old invert to receive two beams. At the left, a completed section of new invert composed of two precast beams with poured concrete slab between them.

While this equipment was being prepared the invert girders were being cast and the electric wires and conduits rearranged in the tunnel. The tracks also were made up in lengths of 18 ft., each supported on steel I-beams under the ties. To drain the sand and lower the water table, holes were drilled in the invert and 15-in. pipes driven down about 5 ft. The lower end of the pipe was perforated and the water flowed down the invert to a sump, whence it was removed by motor-driven pumps.

Two nights were required to each operation. On the first night an 18-ft. length of double track was taken up and the supporting I-beams were removed. Then a trench 6½ ft. wide, across the invert, was cut by means of pneumatic tools, and after removal of the concrete the trench was carried down 8 to 12 in. in the clayey sand. The

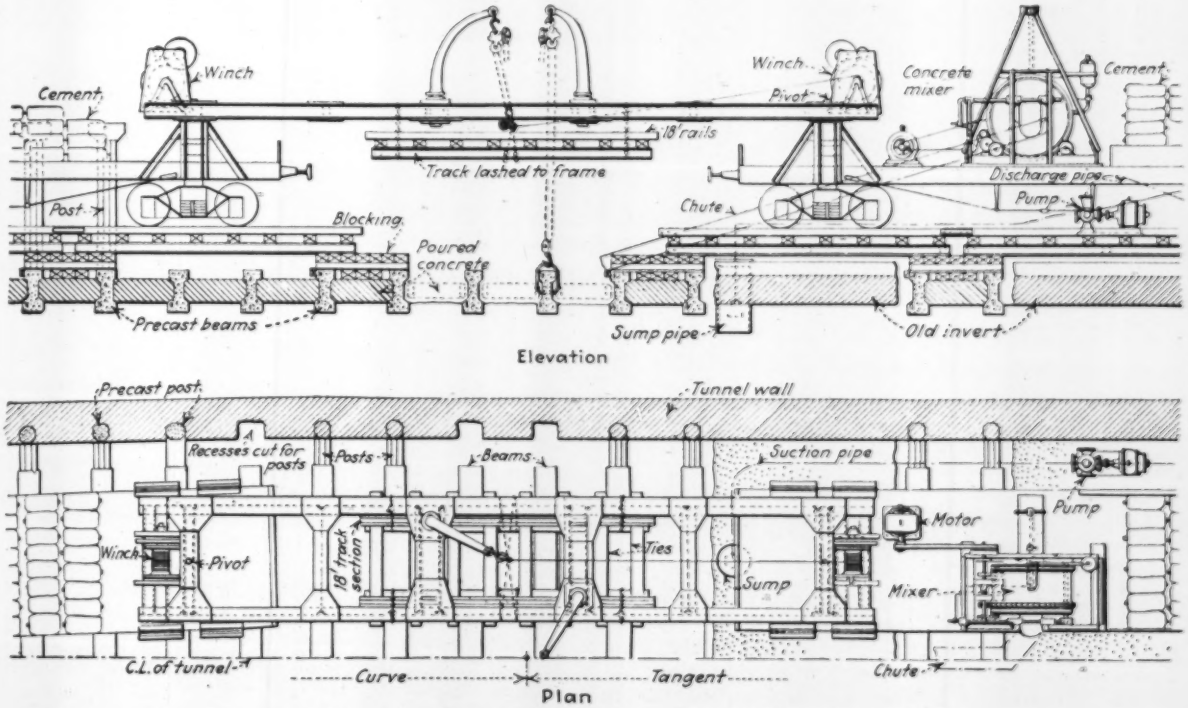


FIG. 4—WORK TRAIN REBUILDING TUNNEL INVERT

Track section raised and lashed to girder between cars. Beam being placed by chain hoist on davit. Chute placed for pouring concrete slab. Some of the octagonal posts to support the roof arch are in position.

beams and tracks were then replaced. These excavations disclosed the fact that while previous grouting of the old masonry had been successful, it was not successful in the sandy ground beneath, as the grout tended to combine with the sand as a sort of concrete instead of flowing to fill the voids.

On the second night the two work trains were run into the tunnel by gasoline locomotives, as electric current was shut off, due to removal of the third-rail conductor. The trains were side by side, each carrying a concrete invert girder. By means of the davits and winches the two girders were lowered and skidded into the space between the tracks. Then the chain hoists raised two parallel 18-ft. lengths of track, with their supporting beams, which were lashed to the long frames between the cars, thus leaving the invert clear, as shown in Fig. 4. The two girders were then swung around and lowered into place in the transverse trench, considerable handling being necessary to get them into exact position, as determined from plugs set in the roof. The ground was then tamped under them with shovels. Steel reinforcement already prepared was placed in the space between the webs of the girders and concrete was chuted into this space from the mixers. Finally the track sections were lowered into place and spliced, after which the trains were run out of the tunnel.

Placing the curved uprights or columns in the side walls, resting on the ends of the invert girders, was a difficult process, owing to their size, their 1,540-lb. weight and the narrow space between the work trains and the walls. These columns were placed both by day and night, in convenient intervals between trains. To insure a firm foundation, the soil beneath the invert was carefully grouted to fill all voids beneath the girders and slabs.

This interesting method of working was proposed and executed by M. Caquot, of the Pelnard, Considere & Caquot Company, and was carried out by that company under the direction of M. Blondel, chief engineer of maintenance-of-way, Paris & Orleans Railway.

Typhoid Toll in Twelve American States Shows Decline

THE typhoid toll for the year 1928 in the twelve American states for which complete data are available averaged three deaths per 100,000 population, compared with 5.3 in 1923, according to one of the tables in "Mortality in Certain States, 1923-28," published in U. S. *Public Health Reports* for May 3, 1929. The figures in the table mentioned are reproduced herewith, rearranged by 1928 rank instead of being given by states alphabetically, as in the original. Besides the typhoid ranking, there have also been added the 1928 ranking of these states in deaths from all causes and in infant mortality, so far as these two classes of figures are available.

Typhoid declined in rate in the six years covered in every one of the twelve states—most notably in Nevada, from 10.4 to 2.6, but in percentages some of the states with low rates in 1923 showed as marked a fall. Alabama, topping the 1923 figures with a typhoid rate of 14.9, declined to 9.5 in 1928, but among the whites the 1928 rate was only 6.3, compared with 14.6 among the colored. Louisiana, the state with the highest rate in 1923, was still the highest in 1928, with a decline from 14.3 to 12.9. How much of this poor showing was due to high typhoid among the colored population is not indicated.

Five states are on the "honor roll" (under two per 100,000; classification of *Journal* A.M.A.). Four of these five "honor roll" states are in the lower rank as to general mortality (this rate not given for Wisconsin). The three typhoid "honor roll" states for which infant mortality is given are also low in that respect, but beyond these five states the infant mortality rank is erratic compared with the typhoid mortality.

TYPHOID FEVER RATES PER 100,000 IN CERTAIN STATES, 1923–28
Rearranged by rank from U. S. *Public Health Reports*, May 3, 1929.

	1928	1927	1926	1925	1924	1923	Rank for Year 1928: Typhoid	Deaths All Causes†	Infant Mortality‡
Twelve states with complete data	3.0	3.7	4.8	6.4	5.2	5.3	..	..	..
Minnesota	0.5	1.0	1.0	1.8	1.4	2.4	1	1	..
Connecticut	0.6	1.1	1.8	2.5	2.5	2.6	2	2	1
Wisconsin	0.8	1.4	1.4	2.0	1.0	2.2	3	..	..
New Jersey	1.7	1.4	2.6	3.1	2.7	3.1	4	3	2
Pennsylvania	1.9	2.7	3.7	4.8	3.9	4.9	5	4	3
New York*	2.1	2.1	3.4	3.4	3.5	3.6	6	8	7
California	2.4	2.4	2.7	2.8	5.7	3.9	7	10	1
Nevada	2.6	6.5	2.6	5.2	..	10.4	8	11	..
Indiana	4.4	4.8	6.7	8.1	7.1	7.0	9	5	4
Maryland	5.2	5.9	7.6	7.4	6.4	6.5	10	9	..
Alabama (total)	9.5	12.5	15.1	16.8	14.4	14.9	11	6	5
White	6.3	8.0	12.5	....	....	....	..	..	..
Colored	14.6	20.2	18.9	....	....	....	..	..	..
Louisiana	12.9	14.6	17.3	34.0	21.9	14.3	12	11	6

*Exclusive of New York City. †Rate per 1,000. ‡Deaths under one year per 1,000 living births.

The original typhoid table showed incomplete data for part only of the four states, the rate being: South Dakota, 2.8; North Carolina, 6.3; Tennessee, 13.4; South Carolina, 18.1. Figures for these states earlier than 1928 are lacking, except for South Carolina, back to 1925, when the rate was 24.8, rising to 26.3 in 1926, and falling to 22.2 in 1927 and 18.1 in 1928. Typhoid death rates among the industrial policy holders of the Metropolitan Life Insurance Company, at ages of one year or more, fell from 5.2 in 1923 to 2.7 in 1928.

Careful Analysis Planned for Core Material of Cobble Mountain Earth Dam

In connection with the construction of the Cobble Mountain dam of the Springfield, Mass., water-works, which is to be of rock and hydraulic fill, a laboratory has been established for the determination of the actual size of the particles contained in the core. Materials which pass through the 240-mesh screen of the Tyler laboratory sieves are put into a new device which has been called the elutriator. This consists of three tubes of 1, 2 and 4 in. inside diameters which are immersed in a water bath with an automatic electric heating unit which keeps the material at a constant temperature during analysis. A definite velocity carries the material into this series of tubes, resulting in four separations. A percolator, to which is attached a vacuum pump, regulates the rate of flow through the material. The separation is apparently very complete. There is also a microscopic projection apparatus by which the material taken from each of these tubes can be seen on a screen which is so rated that the unit and size of the grains are readily established.

The laboratory is under the direction of H. H. Hatch. Hazen, Everett & Pirnie of New York are the consulting engineers. Preliminary experiments were done under the direction of Prof. Lincoln T. Work at Columbia University.

Meteorological Survey for San Francisco Airport

The Instruments Used and Type of Data Necessary to Choose One of Six Proposed Sites for Permanent Development

BEFORE final determination upon the site for the San Francisco municipal airport, one site was chosen for temporary development and this, with five others, was designated for study in order to select the one with the most favorable meteorological characteristics. In co-operation with the city engineer's office the Weather Bureau was asked to outline the survey and to supervise the work during its progress. It is believed to be the first survey of the kind yet undertaken. The following information is given by Ernest E. Eklund, writing in the January, 1929, issue of the *Monthly Weather Review* of the United States Weather Bureau.

Six Sites Chosen for Survey

Six specific sites were chosen for consideration in the meteorological survey, all sites being located south of the city inasmuch as there is water on the west, north and east. It was decided to make weather observations at each of these sites for a period of one year. Instrumental equipment for observing surface weather conditions consisted of an anemograph, sunshine recorder and rain gage at each station. At the headquarters station at the temporary airport, Mills Field, a barograph, sling psychrometer and maximum and minimum thermometers were also used. The anemographs made continuous records of wind velocity and direction. The sunshine recorders were of the spherical lens type in which the record is burned on a strip of cardboard. The record of sunshine, while of no importance in itself, was useful when used in connection with records of fog and cloudiness. The 8-in. rain gages, thermometers, sling psychrometer and barograph were all of ordinary design.

Non-instrumental observations were taken daily at approximately 9 a.m. at each of the outlying stations, noting the amount and kind of clouds and their direction, the height of the ceiling, if any, the range of visibility, and the occurrence of rain, fog, smoke, haze, etc. Hourly records of all these phenomena were kept at Mills Field.

Aerological observations formerly conducted at the San Francisco office of the Weather Bureau were transferred to Mills Field, where they provided information both for the Weather Bureau and for the meteorological survey. The two-theodolite method was used in the balloon observations for the survey, the readings being made at half-minute intervals. Observations were made at several sites in rotation by utilization of an automobile for making the daily round of the stations.

At Mills Field a wind vane on a 20-ft. mast was mounted on the roof of the building, with the thermometer shelter, rain gage and sunshine recorder in suitable locations outside. Each of the other meteorological stations included a house 8 ft. square and 10 ft. high with the anemograph support and sunshine recorder on the roof and the rain gage on the ground near by.

Results of Investigation—In order to make a comparison of fog conditions at the several proposed sites, it was necessary to adopt some number system as an index of relative fogginess. Numbers were assigned to indicate the order of dissipation of fog at the several sites and further comparison was made by totaling the duration of all fogs after 7 a.m. A scale was adopted for indicating ceiling, as follows:

O ..... Surface (dense fog)	*C* ..... Above 1,000 ft.
A ..... Less than 500 ft.	*U* ..... Unlimited
B ... 500 to 1,000 ft. inclusive	*X* ..... Broken

From the daily observations and from the sunshine records it was found that on summer mornings the clouds dissipated earliest at the most southerly site and latest at the most northerly, but that during the winter there was little difference in the height of the ceiling at the several suggested sites.

Continuous records of wind direction were tabulated hourly to sixteen points of the compass at all meteorological stations. The percentage of time the wind blew from each direction also was computed. Since more flying is done in the daytime than at night, the prevailing direction for each site, shown in percentage of time, was computed for the period from 6 a.m. to 6 p.m. Sudden changes in wind direction were found to vary from 38 to 45 deg. for five of the sites. On the remaining site the average was 92 deg., with sudden changes as large as 135 deg. occurring frequently.

From the automatic records of wind velocity it was learned that winds from the west-northwest had the highest average velocity. During the summer months wind velocities increased shortly before noon when the sea breeze began to blow and reached their peak at about 4 p.m. Extreme wind velocities were tabulated for each hour. The tabulation showed that the proposed airport sites ranked in order from north to south as regards freedom from high wind velocities.

Wind Fluctuations Tabulated

Data on amplitudes of rapid fluctuations in wind velocity were obtained by considering such a fluctuation to be represented by the longest vertical line registered during each hour on the anemograph sheets, and it was assumed that the record made by a vertical line would occur within the period of time that would embrace the landing or take-off time of an airplane. Maximum fluctuations for each hour were tabulated and monthly averages of gustiness due to rapid fluctuations in wind velocity were computed. Since rapid variations in wind direction are almost as important as maximum fluctuations in wind velocity, monthly averages of gustiness in miles per hour due to sudden changes in wind direction also were computed.

Turbulence involving air movements with marked vertical components at ordinary flying levels was inferred by means of the pilot balloon observations. An ascensional rate of 180 meters per minute was used because it was necessary to combine the two-theodolite observations for the use of the survey with the single-theodolite observations required by the Weather Bureau. Departures from the normal ascensional rate were determined for each half-minute period. The least average variation from the normal ascensional rate indicated the smoothest air. The strongest vertical air current that was found on any of the sites was downward and equaled 3.8 meter per second, at an altitude of 3,700 ft.

No other suggested site had as favorable meteorological conditions as Mills Field, and this was recommended as the most suitable one for the permanent location of the San Francisco municipal airport.

Second of Two Articles

Large-Volume Earth-Handling Equipment in Germany

Trend Toward Large Air-Dump Cars on Double-Bogie Trucks With Leveling Plows, Transporters and Hydraulic Leveling on Dumps—Electric Haulage Replacing Steam

By Th. Krauth
Technical Director
B. Wittkop Aktiengesellschaft für Tiefbau, Berlin

Hauling and Placing Equipment and Methods

In Transporting excavated earth and placing it in fills and spoilbanks German earth movers have worked out distinctive practices in train haulage and hydraulic leveling and grading. In their enormous transporters for making fills they have developed a machine virtually unknown in American earth handling. Electric railways are largely used. Steel cars are universal. Track-shifting machines and leveling plows are general. The locomotives are of special design. And, finally, the transporters or refilling machines are unique devices of the German earth mover. The article which follows gives a graphic account of these practices and machines for transporting and placing excavated earth. —Editor.

EXCAVATION practice using multiple-bucket or ladder-dredge machines was outlined in the preceding article, because of its distinctive difference from American practice. There are almost

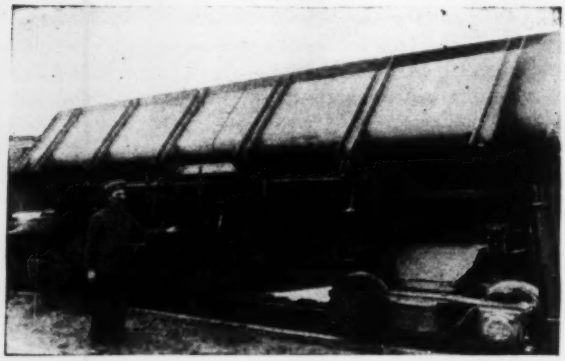


FIG. 1—STEEL DUMP CAR HOLDING 21 CU.YD.

equally significant differences in transportation of the excavation spoil.

Transportation of excavated material in German heavy earth-moving operations is by railway. On the dump the earth is handled to some extent by hand, but more commonly it is placed and spread by leveling plows or large special transporters, or else by water jets. All of these methods have been highly developed, and in particular the transporters are elaborate mechanisms.

Hauling Equipment

Spoil train equipment and track construction are universally of high quality. A particularly notable feature in contrast to American practice is the large use of electric railway. Another is the heavy compact locomotive construction, both for steam and for electric power.

Track Construction—The hauling tracks are normally 90-cm. (35½-in.) gage. On smaller operations and on branch tracks 51-lb. rails are used, but the main tracks for large operations have 72- to 99-lb. rails. The ties are untreated pine hewn on two sides from 8- to 9½-in. diameter sticks. The rails are fastened to the ties with rail spikes or screw spikes, but sometimes, where the tracks are subjected to severe treatment by track-moving machines and leveling plows, bolts are used. To preserve the ties tie-plates should be used.

The three or four rails of the excavator or transporter tracks and those of one of the hauling tracks which lead through these machines are all laid on one tie or sleeper 16 to 20 ft. long and 11½ to 18½ in. in diameter. If there is a second hauling track, it is laid on separate ties. Experience with 26-ft. ties carrying all tracks showed so many breaks that they are no longer used. In fact, the recent tendency is not to place all five rails of the excavator and one hauling track on one set of long ties, but to use shorter ties so staggered that only two or three rails rest on each one. This allows a wider gage for the excavator rails and increases the stability of the excavator.

Especially heavy tie plates are used under the ex-

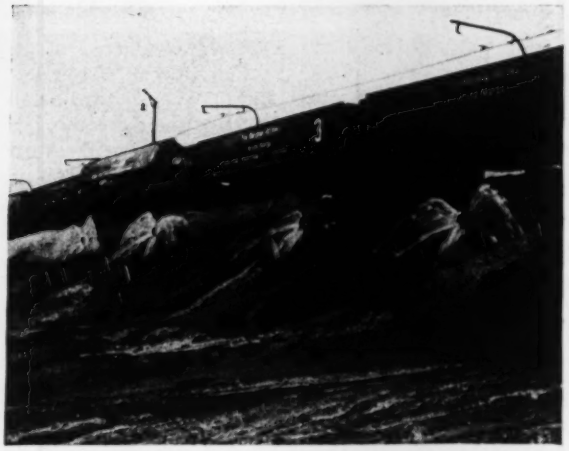


FIG. 2—STEEL DUMP-CAR TRAIN ON WASH DUMP
Note the flat slope characteristic of wash dumps particularly in sand, and requiring the construction procedure shown by Figs. 11 and 12.

cavator track rails. It is important, too, that the fastenings to the ties be such that broken ties can be easily replaced while the machine is in operation. A good roadbed is particularly important. On bad ground special ballast material, though expensive, pays for itself in reduced maintenance.

Dump Cars—The size of cars varies with the capacity of the excavator and also to some extent with vagaries in practice. The normal practice is to use steel self-dumping cars of 5¼- to 7¼-cu.yd. capacity. For special fills, such as levee tops, smaller cars are preferable; the large cars throw the material too far and make expensive rehandling necessary. For heavy soils the cars should have roller bearings, but these are not often used on present equipment owing to their cost.

There are coming into use, however, 21-cu.yd. cars with spring trucks and roller bearings. They were first introduced in stripping work, but they have proved so satisfactory that several contractors are now using them

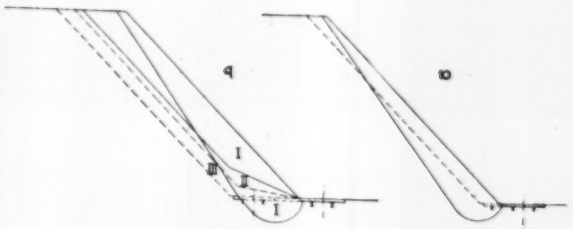


FIG. 5—GRAPHS COMPARING HAND AND PLOW LEVELING

carrying 131 cu.yd. The large-car train with the same engine output shows an increase of 40 per cent in transport capacity. Being equipped with air brakes, the large-car train is under better control and higher speeds are possible. The time of a large-car train to and back from a dump 2½ miles away was in an observed case 40 to 50 minutes, as compared with 60 to 70 minutes

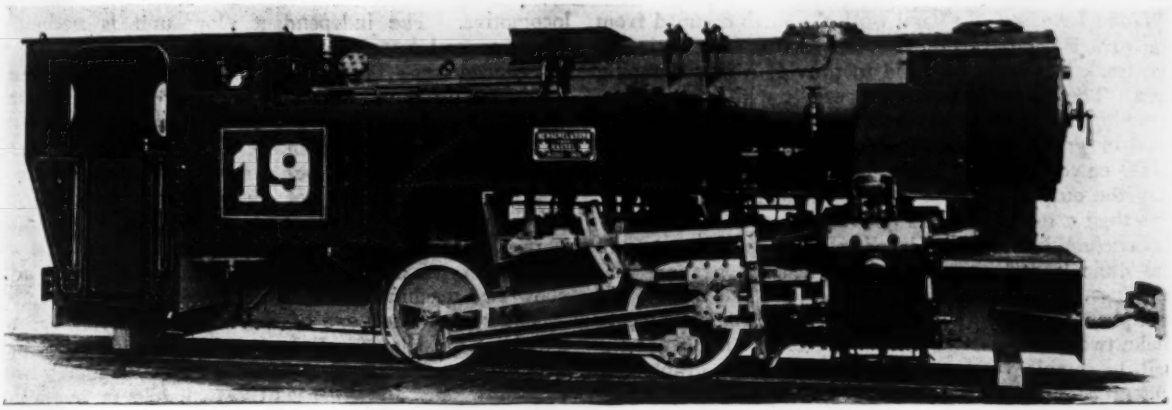


FIG. 3—TYPICAL LOCOMOTIVE FOR SPOIL TRAIN OPERATION
These low-hung engines for use with bucket excavators range from 200 to 310 hp. They weigh from 24 to 33 tons and have a speed of 18½ miles an hour.

in other large earth-moving operations, as the Mittelland Canal, where the volume warrants the initial investment. These cars weigh 14 tons and carry a 32-ton load. Despite their great loaded weight, the spring trucks so distribute the load that the large cars work well on the dumps. They can also be tripped by one man operating the air cylinder attached to each car and fed from the locomotive.

Observation of both 7-yd. and 21-yd. car operation on stripping gave the following records: A 25-car train of 6.95-yd. cars containing 131 cu.yd. was unloaded in six minutes by seven men, or at a rate of 3.1 cu.yd. per man per minute. A 440-hp. locomotive can haul ten 21-yd. cars carrying 181 cu.yd., or 25 6.95-yd. cars for a 6.95-yd. car train. The large cars spill less material and empty more cleanly and rapidly. In general, in using large cars a saving of 20 to 25 per cent can be expected. Fig. 1 is a view of one of the large cars tipped to show the under frame and dumping mechanism. A train of these cars on a wash dump is shown by Fig. 2.

FIG. 4—ELECTRIC LOCOMOTIVE FOR LARGE CAR SPOIL TRAINS
Note the gooseneck trolley poles which can be detached and shifted; 1,100-volt direct current is used. These engines weigh 50 tons.

Locomotives—The advent of the large car is due to the electric locomotive. Steam locomotives, however, are in general use. Formerly the largest of these was 160 to 200 hp., but now they run from 210 to 270 hp., even to 350 hp. on large operations and where the haul is long. As the locomotives have to pass through the excavator and work on temporary tracks, they are of low build, as shown by Fig. 3. The usual operating speed is 6¼ miles per hour.

An electric locomotive is shown by Fig. 4, which also indicates clearly the trolley line construction with gooseneck poles which can be detached and shifted. The usual locomotive weight is 50 tons; 1,100-volt direct current is used. Both the electric locomotive and large cars are excluded from general use chiefly because of first cost.

Placing Equipment

Disposal of excavated material is the most difficult problem in earth moving. Practice discloses four general methods: (1) hand dumping and hand leveling, (2) hand dumping and plow leveling, (3) transporter placing, and (4) wash dumping.

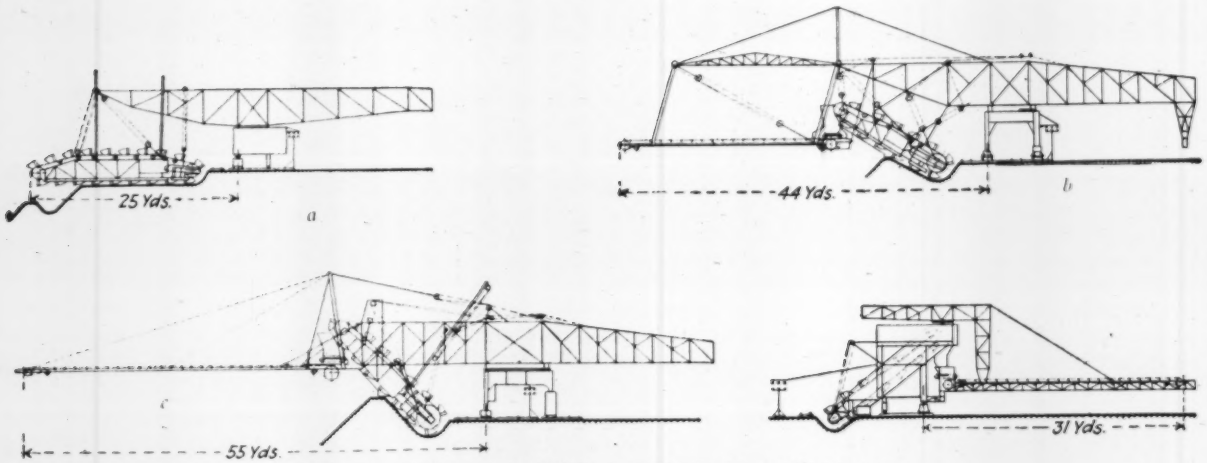


FIG. 6—TYPICAL TRANSPORTER TYPES IN COMMON USE

Hand Leveling—In hand work the earth dumped from the cars is leveled with shovels. After each trainload the track is shifted by hand to provide a new dumping area. The output is limited, especially with heavy earth. Leveling and grading require a large force of men. With sand or gravel a dump gang of fifteen men can handle 2,000 cu.yd. in eight hours. With heavy soil such as clay the output per man will be cut in two and may be less than a quarter of the quantity named.

Leveling Plows—The leveling plow applies power to the difficult and time-consuming task of grading and leveling. It removes the soil left above the track plane and pushes it down the slope. In general the plow has to make two or three trips, depending on the nature of the soil, to complete its work. Fig. 5 compares graphically the procedure in hand leveling (*a*) and in leveling by plow (*b*). The plow clears the dump and the slope so far that the train can dump two or three times in the same place.

The plows generally used have a wing extension of 7½ ft., and this requires (according to the soil) 170 to 260 hp. For stripping, plows having an extension up to 12 ft. are used, requiring 400 to 500 hp. to operate. In the large plows the adjustment of the shares is mechanical. The output per man with plows is about double that in leveling by hand. Sometimes the plows are pulled by the spoil trains, but generally by a separate locomotive. The independent plow unit is necessary where several dumps are to be served.

Transporters—Transporters or refilling machines originated in the brown-coal mining operations, where the coal seams are up to 350 ft. thick and there is from 35 to 70 ft. of overburden. Owing to the thick seams the area of the worked-out part to be refilled increased very slowly; there was not adequate face for dump-car fill. Small-area deep fills had to be made. The transporter was devised to meet these conditions. Represensative types are shown by Fig. 6, and Figs. 7 and 8 show two machines on the work.

The author used one of the first transporters of the simpler type shown. It had a 19-ft. ladder, but was afterward strengthened to carry a 39½-ft. ladder. Such small machines are still used on small jobs or in preliminary work on the dump for large machines. As experience was gained—in early operations several machines slid down the bank—the transporter was made to discharge farther from the track by auxiliary conveyors.

Transporters of the type Fig. 6*a* do good work with small drops of 50 to 60 ft., but are insufficient for greater drops and for unstable soil, for there the material falls on the slope and slides off. A greater unloading reach was sought by adding a conveyor as shown by the other machines of Figs. 6, 7 and 8. Belt conveyors were used to keep the outrigger as light as possible and

FIG. 7—TRANSPORTER MAKING EMBANKMENT FILL

FIG. 8—TRANSPORTER MAKING PIT FILL

obtain a length of conveyor which would discharge clear of the slope. With these machines fills 250 ft. deep have been made. Such deep fills occur only now and then, but the heights are now generally enough so that the transporter track can remain in the same place for weeks.

In operation the spoil train which passes under the transporter dumps onto a bench or into a trench covered by the bucket ladder of the transporter. The buckets then take the spoil and shift it directly into the fill as shown by Fig. 6*a*, or they lift it onto the conveyor as shown by Figs. 6*b*, *c* and *d*. When the fill comes to the top, the bucket ditch is filled and the machine and track are shifted toward the pit. Theoretically the distance of shift is the length of the conveyor, but with loose-earth fill the shift to be safe from slides must be something less, depending on experience on the particular dump.

With the development of the conveyor and the increase in the size of transporter new forms were introduced. One was a machine for making fills above track level, as shown by Fig. 8. Another was a revolving machine such as is shown by Fig. 6*c*. This machine has full-circle rotation and handles into embankment or pit as required. The elevating transporter, as all the other forms, was first developed in the brown-coal mines. It was designed to meet the situation where a mine was being opened up and the material stripped had to be piled on the surface until enough of the mine had been worked out to afford a waste pit. Ability to pile up the waste cut down the areas that had to be purchased for dumps. These elevator transporters for this reason found their way into construction. They were first used on the Shannon River power development in Ireland (*Engineering News-Record*, April 7, 1927, p. 554). They are now being installed for dam construction in Ottmachau in upper Silesia and are working on the Mittelland Canal. In the canal work the spoil area is limited and the transporters work ahead filling and then return building embankment, as shown by Fig. 9.

The transporter is economical only on large operations where it can be operated to capacity. It will handle approximately twice as much loose spoil as an excavator with the same bucket volume can excavate. The machine also has an economic advantage, even with less than capacity output, where the material is to be placed in embankments as levees and dams. Here it does away with track and track upkeep and heavy grades.

Wash Dumps—Leveling and grading dumped material with water jets also originated in brown-coal mining where the soil could be washed into exhausted workings. Later its use was extended to active workings where large spoil areas were available. A good supply of water is essential.

A 12-in. main is laid behind the dump track as shown by Fig. 10, and from it, 6 to 12 ft. apart, pipes extend under the track to the dump face. Fig. 2 shows a dump face with the jets in operation; the spraying of the discharge is caused by disks placed temporarily in front of the nozzles to remove the soil between the pipes. In practice, to get better effect from the jets, the cars are dumped three to five at a time and only the jets of this section of dump are turned on.

In wash dumps, light sand deposits as shown by Fig. 11. As the full length of the dump becomes built up as shown by the solid lines, the water is shut off and the dump is dry filled until a new face is provided for wash-

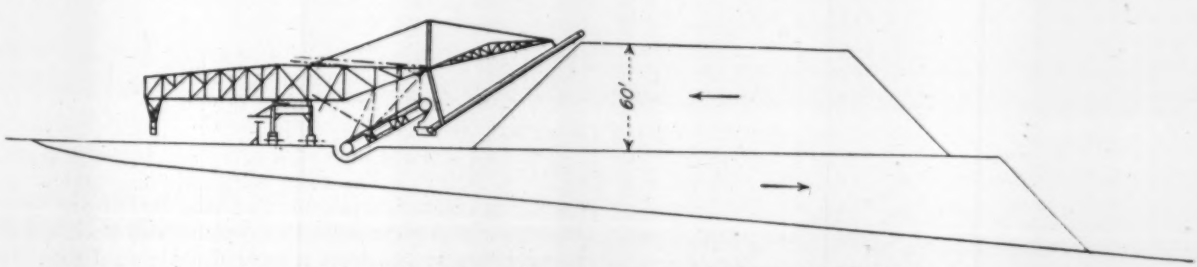


FIG. 9—TRANSPORTER SPOIL BANK ON MITTELLAND CANAL

ing. Heavy clay soil takes the form shown by Fig. 12. This material requires more water and the output is less. Also, if the material holds water, the track cannot be advanced so fast.

FIG. 13—BUILDING CANAL ON EMBANKMENT BY DUMPING AND JETTING

A good wash dump will take the material of several excavators. From three to five men will do the dumping and attend to the pipes; the output may easily reach 1,300 cu.yd. per man per shift. Wash dumps have

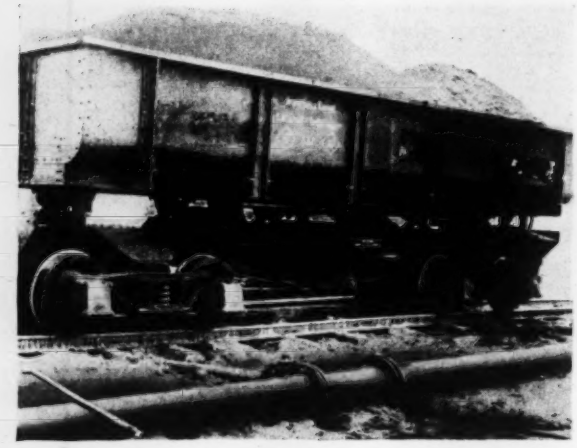


FIG. 10—PRESSURE MAIN AND JET PIPE FOR WASH DUMP

been rarely used in construction. At present they are being employed in the Mittelland Canal work on a stretch where the bottom of the canal is 33 ft. above the surrounding ground and the construction is carried on as shown by Fig. 13. In general the large spoil area and large required volume of water limit the application of wash dumping. From 200 to 2,000 gal. of water may be required per cubic yard of earth.

Summary

Volume earth moving in Germany is by bucket excavators, with haulage by dump cars and disposal on the dump by leveling plows and transporters. The plant output depends on the excavator, and this on the nature of the soil and its water content. Dry sand gives the greatest outputs; sometimes, due to heaping in the buckets, the output is greater than that theoretically possible. Boulders make the use of bucket excavators difficult. Heavy clay is very difficult; the buckets partly fill and the power consumption is large. Wet clay often blocks the bucket opening. Water also means changes of slides and calls for exacting care in selecting slopes and depths of cut. Clay also tends to swell and make car measures false. The influence of the soil on output is illustrated by two operations of the author on the Mittelland Canal. In boulder marl containing very little clear sand and with a haul of 3 to 4½ miles an output was obtained of 13 cu.yd. per man per shift. In wet sand with a 2-mile haul the average output was over 26 cu.yd.

FIG. 11—FORMATION OF WASH DUMP OF SAND

FIG. 12—FORMATION OF WASH DUMP OF CLAY

Freezing and Thawing Test Recommended for Masonry Materials

The only reliable method of determining the resistance of masonry materials to frost is by a freezing and thawing test, the U. S. Department of Commerce believes. This test should be used as a guide whenever possible, the department says, though in some cases simpler laboratory experiments may furnish valuable information.

The Bureau of Standards has found that materials of high strengths and low porosity or absorption are generally the most resistant to frost action. The degree to which the pore space becomes filled when the material is immersed or partly immersed in water gives some indication of the frost resistance. Those materials which become highly saturated during a given period of soaking are not likely to resist the action of frost as well as those which become saturated to a less degree. Materials which suffer a loss of strength when soaked in water often show less resistance to frost than those which are not appreciably weakened by soaking, although this is not a very dependable guide when considered alone.

While these considerations are of value in arriving at frost-resisting properties of stone, the bureau declares, they are not sufficiently reliable to supplant an actual freezing test, which should be used as the guide whenever it is feasible to make the test. A reliable test for measuring frost resistance that could be made in a short period of time would be of great value, and this phase of the problem is being studied at the bureau.

Road Maintenance Easy in Bermuda

The Bermuda Islands, being composed almost entirely of coral and limestone rock, provide a paradise for the road-maintenance gang. When a hole appears in the road it is merely necessary to scarify it with a pick, loosen a small amount of rock from the side of the road, place the loosened rock in the hole with a little water and tamp it into place. After tamping, the patch is sprinkled with water and a small lawn roller drawn over it, and the road is ready to receive traffic.

The fact that the horse-drawn vehicle is the principal mode of transportation, there being only six automobiles on the islands, makes possible this ideal patching method. If automobiles were used to a greater extent, it would be necessary to construct a more durable road than the natural rock.

From Job and Office

Hints That Cut Cost and Time for the Contractor and Engineer

Shortcut for Beam Computations Uses Moment in Foot-Tons

By Frank Wright
Assistant Construction Engineer, Southern Sugar Company, Clewiston, Fla.

A SHORTCUT method that is old among steel men and useful for determining the proper size of beams is offered here only because it seems to have been forgotten by the general run of men now in the drafting room and on the road soliciting steel orders.

In the well-known equation $S = \frac{Mc}{I}$ or $\frac{I}{c} = \frac{M}{S}$, M is in inch-opunds. If, however, inch-pounds is expressed as equal to foot-tons $\times$ 2,000 $\times$ 12 and a fiber stress of 18,000 lb. per sq.in. of steel is assumed, the equation becomes

$$\frac{I}{c} = \frac{M \times 2{,}000 \times 12}{18{,}000} = \frac{4M}{3}.$$

In other words, the section modulus required is numerically equal to $1\frac{1}{3}$ times the bending moment in foot-tons.

Therefore, in selecting a beam, compute the bending moment in foot-tons, add one-third to secure the necessary section modulus, turn to the "properties of sections" in a handbook and select the beam. If it is desired to use a fiber stress of 16,000 lb. per sq.in., one-half the bending moment in foot-tons should be added instead of one-third.

Heavy Casting Flame Cut, Shipped and Restored to Use by Welding

CUTTING a 50-ton cast-iron casting into two sections for shipment to another locality where it would be reassembled by welding constitutes an unusual example of the use of modern equipment and methods recently carried out at the plant of the Michigan Limestone Chemical Company, Rogers City, Mich. Two cuts (one is shown in Fig. 2) averaging in thickness from 6 to 18 in. and being about 6 ft. long, were made by the use of oxygen pressures varying from 60 to 90 lb. and acetylene pressure at 10 lb. The cut shown was made in one hour and ten minutes, and the similar cut on the opposite side of the casting was made in one hour and twenty minutes. In the case of the latter it was attempted to take advantage of an expansion crack and save time by boring a hole at one end of this crack with the cutting torch and an oxygen lance; but the total time required was slightly greater than that for the straight first cut. For the first cut a total of 660 cu.ft. of oxygen and 180 cu.ft. of acetylene was used.

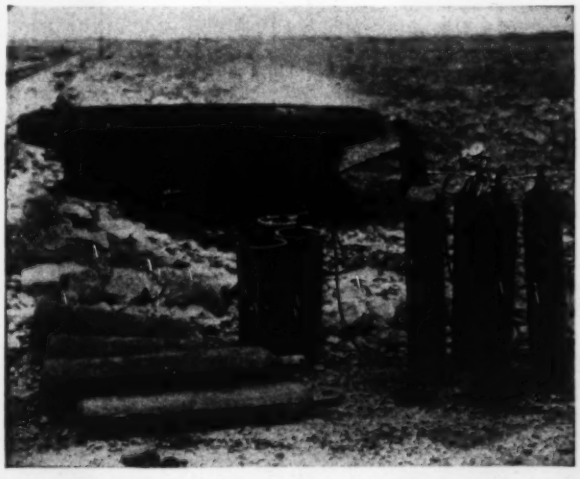


FIG. 1—FLAME-CUTTING A HEAVY CASTING 6 TO 18 IN. THICK

FIG 2—VIEW OF THE COMPLETED CUT IN 50-TON CAST-IRON CASTING

The work was done by the maintenance department of the Michigan Limestone Chemical Company, Joe Penglaze, general superintendent, and was supervised by J. W. Keyes, of the Weldit Acetylene Company, Detroit, Mich.

Contractor Uses Airplane for Wide Variety of Work

MANY uses have been found for the airplane purchased some time ago by the Woods Brothers Corporation, Lincoln, Neb., according to Mark W. Woods, president. In its extensive stream-control work, the company has used the airplane to make stream studies covering such factors as current direction and stream depth. The plane is, of course, useful for aerial photography. It has also been found to be an important selling agency, as prospective patrons can be shown work under construction or completed in an effective way. The company own a considerable acreage of land in eastern and northwestern Nebraska

and western and central Iowa, some of it distant 250 miles from Lincoln. All of it can be inspected in one day with the plane.

Economy of time in transporting executives and engineers has been one of the big factors that has made the plane indispensable to the company. The chief branch office of the company is located in Kansas City, 170 miles distant. Frequently the plane leaves Lincoln at 8 a.m., arrives in Kansas City an hour and forty minutes later, permitting the engineers to spend most of the day there, leaving at 3:30 p.m., to get back to Lincoln about 5 p.m. The plane is a six-place machine with inclosed cabin.

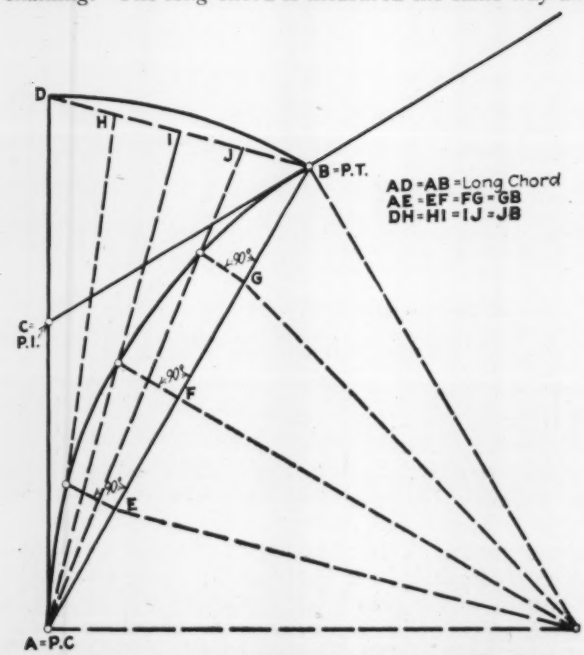
The record of expense of operation for six months shows that even through the winter period the cost per mile was only 50.2c. The cost per passenger was 22.8c. per mile. Repairs for the six months amounted to $165.95, an average of $27.50 per month. The actual cost, including gas and oil, repairs, hangar and field expense and all miscellaneous items, totaled $1,410.20 for the six-month period. An arbitrary charge of $2,210 was made for depreciation. The combined salary and expense of both pilot and mechanic totaled $4,290.26. During the six months a total of 182 flying hours was checked up and 338 passengers were carried 17,875 miles. The plane used 2,827 gal. of gasoline and 408 qt. of oil.

Locating Curves in the Field Without Instruments

By C. K. Clausen
Seattle, Wash.

THE attached diagram indicates a method of locating curves in the field for rough or preliminary work without instrument or tables. It is sufficiently accurate for some classes of work and very fast.

The length of the semi-tangents having been chosen, the P.C. and P.T. are established by pacing or rough chaining. The long chord is measured the same way and divided into a number of equal parts. The long chord is then measured along one of the semi-tangents produced and the line connecting the end of this line with the P.T. or P. C., as the case may be, is divided into the same number of parts as the long chord. By lining in from the P.C. or P.T. and from offsets to the long chord points on the curve are established.



ROUGH FIELD METHOD OF "RUNNING IN" CIRCULAR CURVES WITHOUT INSTRUMENT OR TABLES

From Job and Office

Hints That Cut Cost and Time

Floodlighting a Dome From the Interior

EVEN floodlighting without shadows of a dome from below has been solved in a novel manner in the new Williamsburg Savings Bank Building in Brooklyn, N. Y.

FLOODLIGHTING AN APPARENTLY SOLID DOME FROM THE INTERIOR

In this case the lights have been placed inside of the dome, which is constructed of horizontal metal louvers, not of glass. When viewed from below, these louvers overlap and their gilded surfaces appear to be solid. At night the floodlights on the interior illuminate the entire outside surface by reflection through the openings.

Dipping Ends of Cable Strands in Solder Facilitates Splicing

By Elton Sterrett
Savannah, Ga.

CONSIDERABLE time was saved in the splicing of over a hundred eyes in the ends of $\frac{5}{16}$-in. 6x19 galvanized-wire cables by dipping the ends of the strands in molten solder instead of seizing them with fine wire, as is the usual procedure.

The customary wire seizings were made each side of the mark for cutting the cable into the lengths desired,

From Job and Office

For Contractor and Engineer

spaced 4 in. apart, permitting the six 2-in. long strands to unwind slightly and broom out. On each of these strands ¼ in. from the end a temporary seizing of pack thread was wound by hand, compacting the nineteen wires to approximately their former diameter. The entire cable end, thus secured, was dipped into molten resin flux and then barely plunged below the surface of a hot solder bath. The solder, drawn up between the wires by capillary action to the limit of the seizing, hardened instantly when the cable was withdrawn from the bath forming a compact knob. This feature permitted the ends to be threaded between the strands for the forming of the splice in one-half the time required for making the eye with the wire ends merely seized as in the usual manner. After completing the splice the soldered ends were clipped off and the individual wires tucked as with a plain splice.

Tests to destruction of a set of eyes, all made by the same man, half with and half without the solder-dipped ends, showed an average breaking stress 5 per cent higher in favor of the solder-seized splices. This was probably due to the fact that the individual wires were firmly held by the solder and there was no opportunity for a part of the wires to work loose and avoid their share of the load, as may be the case where a wrapped seizing is relied upon.

Since the satisfactory experience with cables of small size, solder-seizing was tried and successfully used on cables up to ⅝ in. in diameter. The cost of the solder method was lower, as a fifteen-year-old boy made entirely satisfactory splices with solder-held strands.

San Mateo 300-Ft. Lift Span Floated to Site and Lowered With Tide

FLOATED 8 miles on two barges from the assembling site, the 300-ft. lift span for the San Mateo-Hayward highway toll bridge across San Francisco Bay was maneuvered into position some months ago and lowered to the piers by the receding tide.

The five 300-ft. steel spans, including the lift span for the main channel crossing, were erected at South San Francisco on a platform parallel to the bay shore about 18 ft. from the ground, supported on piles with two tracks carried on rows of similar piles extending out over the bay. The spans were assembled with the bearing plates directly over these tracks and when finished were moved sidewise on steel rollers out over the water and the barges were floated into position. Before transferring the load from the tracks to the barges, each span was jacked up to the proper elevation above high tide for placing on the bridge piers and the columns of the truss directly over each barge were stiffened by lashing timbers to the steel members.

After the barges were properly located, a heavy timber crib was built up on each barge about 35 ft. high and the weight of the span was then transferred to the barges with a rising tide and the span was ready to be towed to position, as shown in the accompanying illustration.

Three tugs were required to tow the 617-ton lift span to the site against a strong head wind. Approaching the bridge two of the tugs dropped behind and took lines attached to the stern of the barges to aid in bringing the span into position. Each barge was equipped with a double-drum hoist to facilitate final maneuvering, which was done with the aid of four anchors, placed up- and down-stream. This arrangement supplemented by a small hand winch at each end of the span with a light line to the adjacent piers gave complete control to the movements of the barges.

In less than twenty minutes the lift span was maneuvered into place and in about an hour's time the tide had lowered sufficiently to let the span come to rest on the temporary cribbing placed on the concrete piers. Jacks were not used in this operation and the span was seated solely by means of the ebbing tide. After the counterweights and lifting mechanism were placed, the span was raised and the bearing shoes were put into place.

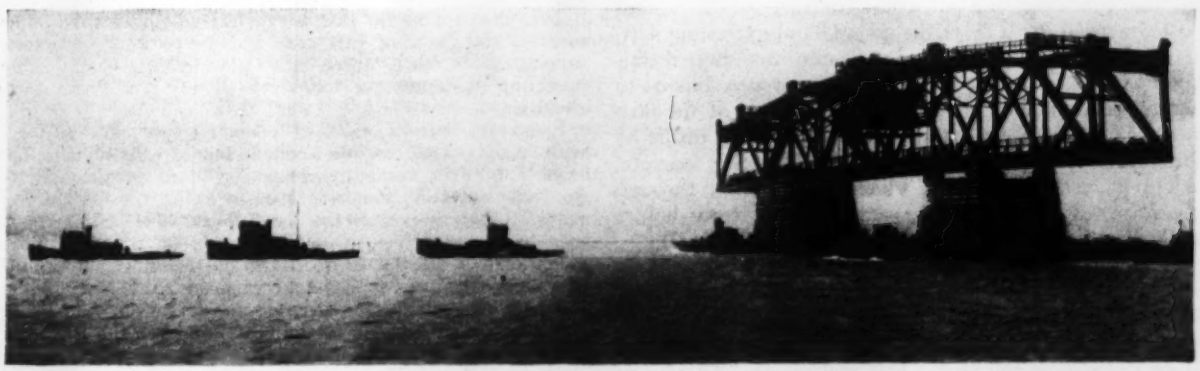
The F. L. Holser Construction Company, of Los Angeles, assembled and installed the spans, under the personal direction of F. L. Holser, president of the construction company.

Replacing a 1,000-Ton Septic Tank Raised by a Flood

By O. P. Mahoney

Commissioner of Streets and Public Improvements, Joplin, Mo.

WHAT method should be used to replace a 1,000-ton septic tank costing $12,000 which has floated out of position? Incredible as it may seem, this



SAN MATEO BRIDGE 300-FT. LIFT SPAN ON TWO BARGES

occurred several years ago in Joplin, Mo. The tank is located about 100 ft. from Turkey Creek, a small stream at the north boundary of the city. It is 80x52 ft. in plan, with a depth of from 19 to 22 ft. The top was built flush with the surface of the ground. Footings 3 ft. wide were placed at each end and under each of the six intermediate baffles.

When excavation was started it was discovered that the site was intersected by two drifts leading from an old mine shaft near by. It was necessary to keep pumps in operation day and night to handle the flow of water through these drifts. When the concrete was poured, an 8-in. opening was left near the bottom on one side so that if the pumps should fail, pressure inside and outside of the tank would be equalized.

Just as the project was practically completed, a heavy rain caused Turkey Creek to overflow during the night. A cave-in near the creek bank allowed floodwaters to rush through the drift into the excavation. Débris clogged the vent of the tank, which was lifted bodily, carrying all but one of the footings with it. Part of the excavation at one end caved in, washing boulders underneath. The final position of the tank showed a lift of 3 ft. at the south end and 1 ft. at the north end. The problem was to replace it to original grade.

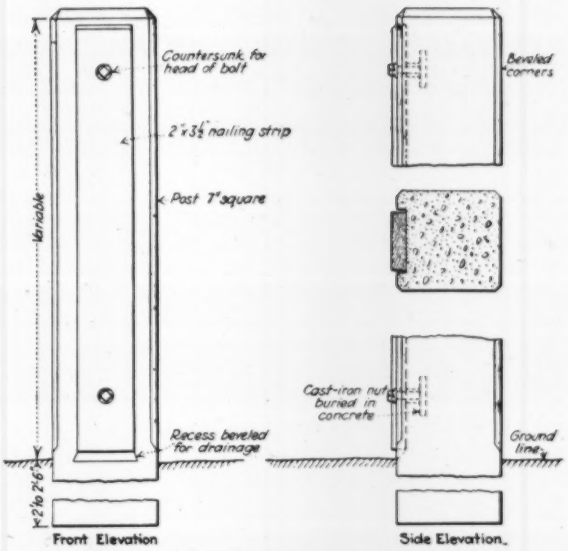
The first step of the replacement scheme was to enlarge the excavation so that men could work easily at the base of the tank. Then a transverse ditch was dug through, and the boulders were gradually rolled into this, being replaced by sandbags. This packing was started at the low end. When all boulders had been removed, the sandbags were split and a high-pressure hose was used to wash the sand out from beneath the tank. Although the settling was rapid at first, the tank dropping 2 ft. in less than two hours, it was a week before the tank assumed its final position 1 in. above grade at one end and 2 in. at the other. This was considered close enough for all practical purposes.

Nailing Strip on Concrete Fence Posts Permits Easy Wire Renewals

By C. H. Martyn
Johnstown, Pa.

On a highway right-of-way fence job in Pennsylvania, specifications call for a concrete post carrying five strands of wire, the wires to be fastened to the post by some means permitting easy renewal. The concrete fence post with a 2x3½-in. wood nailing strip as detailed in the accompanying illustration was designed for this job. On this particular contract a 7-in. square post was used, set 2 ft. in the ground and extending 4 ft. above the ground. The posts were cast in a sheet metal-lined wood form. The sides of the form were hinged to permit easy stripping. A recess on the face of the post was formed by placing a 1x4-in. board on the inside of the form. Cast-iron nuts were buried in the concrete, held in place as shown in the illustration by a bolt through the form. This bolt is removed from the form before the concrete has set.

A standard 2x4-in. strip is ripped down to a 3½-in. width and is fastened to the post by two countersunk bolts. As the commercial 2x4-in. lumber is but a trifle more than 1½ in. thick, the nailing strip will extend out from the side of the post a half-inch or so. This keeps the wires away from the concrete. The wires are fastened by ordinary staples, which permit easy renewal and a change of height of wire, if desired.



WOOD NAILING STRIP FOR CONCRETE POST

A very attractive post can be made by finishing the concrete post with white cement and painting the wooden nailing strip a suitable color.

Letters to the Editor

More on the O'Fallon Decision

Sir—The real crux of the difficulty involved in the celebrated O'Fallon case is not fully set forth in your editorial comment of May 23 or in J. L. Campbell's communication in the issue of June 20.

Earnings for return on capital and recapture of accomplished earnings are generically different and cannot be properly handled on the same valuation base. Ethically, they have no common denominator. The capital on which return may be earned by a public utility, such as a railroad, should be based on a valuation representing the fair investment as nearly as may be, but return should not be allowed on the unearned increment in the value of the plant due to society's advance and the rise in wages. Recapture of excess earnings, on the other hand, is analogous to pre-emption of property by public authority and should follow the rule in use for takings by eminent domain. Under these proceedings the appraisal must be of the date of taking. What the property cost or how acquired—by gift, inheritance or otherwise—is immaterial; present cost of reproduction less depreciation, deferred maintenance, etc., must govern.

This theorem means that a railroad will have two values to cover the fixing of just rates and the recapture of excess earnings. In fact, there are other values—sale value, operating value, merger value, etc. There is nothing weird about it.

Speaking broadly, railroad managers are now satisfied with rates based on the commission's valuations. The trouble is with recapture demands, based erroneously on the same valuation that was used in fixing rates. The law requires that rates must be fixed to produce, as nearly as may be, a capital return of 5¾ per cent on the sum of the valuations of all the railroads in the country. Recapture of excess earnings applies to occasional roads only, which indicates two classes for separate consideration. As to the Supreme Court decision in the O'Fallon case, the issue was on recapture only with no reference to rate making; and the court's finding was based on right and reason when we look at it solely from that point of view.

If present reproduction is used for recapture, perhaps the law can be enforced and the I.C.C. and Supreme Court would save their faces.

Under this plan a well-conditioned road would be allowed to make a higher rate of return on its fair investment than an ill-conditioned line. This, however, accords with natural law and with that laid down in Scripture that "unto him that hath shall be given."

J. P. Snow,
Consulting Engineer.

Boston, Mass.,
June 25, 1929.

Courtesy an Asset to the Engineer

Sir—Comments both of Mr. Lavis and of Mr. Witteman in recent issues on the advantages of the "amenities of life" to members of the engineering profession are greatly appreciated and most cordially indorsed and advocated. Courtesy is a great asset to success in life; that "the gentlemen wins"—in the sense that a gentlemen is one who is thoughtful of others—is a truism. That the want of graciousness toward others is a great loss has often been proved. Unfortunately the respect due to the achievements of the profession is withheld because too many engineers act, as Mr. Witteman truly says, as if they "were in trade rather than practicing a profession." Our English brethren certainly deserve the commendation given them and the same can be said of those of the great French schools. But courtesy is a well-known characteristic of the French; as Joffre said, "Ours is a polite nation."

By contrast may I be permitted to give an incident which I trust may not be considered irrelevant? At an informal gathering of officers of one of our largest and best-known railroad companies, of which the chief engineer was a noted man of renown in his profession but unfortunately one of much gruffness and abruptness in his dealings with others, the conversation turned into a discussion of the various qualifications of persons not at the meeting. Someone asked how it was that the non-present chief engineer had reached his great position and influence. No reply was made immediately, but after a time an official chiefly remarkable for his affability and great reticence, as he seldom contributed to the "gayety of nations," to the astonishment of his confreres quietly remarked: "As we all know Mr. ——— has so little knowledge of engineering, he must have been appointed on account of his good manners."

Walter AtLee.

Baltimore, Md.
June 16, 1929.

More Mortar and Less Rock for Uniform-Strength Concrete

Sir—In Nathan Johnson's articles (*Engineering News-Record*, Jan. 24 and 31 and Feb. 14 and 21, 1929) he draws a picture of the concrete situation that is fair to the contractor but not flattering to the engineer and architect. The writer feels that Mr. Johnson has missed the point in naming sand as "the devil in the cheese." Rock is the devil in the cheese, not sand.

Mixes designed for high strength—that is, with a minimum of sand and a maximum of rock—run up against the practicality of field conditions; spots with an excess of soup or with an excess of rock are bound to occur in every project. Every man in the crew who has tamped and booted concrete knows that it is rock segregation and rock pockets that he is hired to fight all day long. The price of crowding in the rock has placed all the responsibility on the engineer in the field and thus made strength and uniform concrete dependent upon the personal equation. A hard-boiled conscientious inspector with enough help and authority over the contractor can call for an army of tampers and slow down the work to the point where he can get the results desired. But it costs bitterness, money and loss of co-operation. The answer is simple: More mortar is what is needed to offset the rock.

Why should rock be stressed? It is simply an inert filler in concrete. It costs 50 per cent more than sand. It is theoretically and economically valuable in concrete up to a point where it is a mischief maker, and then it is increasingly harmful in a geometrical proportion to the amount added. It is not the writer's thought to dispense with rock, but only to cut rock down to an economical point; not to dispense with inspection but with unnecessary inspection.

The engineering department of the city of Los Angeles during the past three years has encouraged sand inundation, which has added practically 20 per cent sand to the mortar and yet the average breaking strength has increased. This past year a mix of 1 : 2 : 3 was written into the specifications to insure workability. Measuring the sand by weight, on the first job completed, gave a yield of 6.44 sacks and an average breaking strength over the entire job of 4,050 lb. On twenty different pours in columns and reinforced footings, the average strength was 4,450 lb., with low breaks at 4,000 lb. To get this result the cement yield was raised one-half a sack per cubic yard of concrete, increasing the cost 30c. a cubic yard, which is cheap insurance for the designer.

Although this was the best mix ever used from an ideal point of view, there was still room for improvement when it came to pouring it into the deck, beams and column heads. With a surplus of strength of 1,000 lb. over the desired ultimate strength of 3,000 lb., why not sacrifice a part of this surplus strength, which is an economic waste, by using still more mortar and obtain still higher workability and reliability? If sand is added to make the mix 1 : 2½ : 3, the yield of concrete to cement will return to approximately six sacks per cubic yard of concrete and the workability will be increased.

So-called oversanding the mixes removes the necessity for close rock grading, for with a workable mix there is no relation between close rock grading and strength. Mortar and workability are closely related. They speed up the placing and lower the cost, and remove the importance of the personal equation in the field and the cause of so much friction between engineer and contractor.

D. T. Boardman,
Resident Engineer on Bridgework,
City of Los Angeles, Calif.

Los Angeles, Calif.,
June 5, 1929.

Against Toll Bridges

Sir—In your editorial "Toll-Bridge Developments" in the June 27 issue you might very well have mentioned an item of expense connected with toll bridges which should be considered an inexcusable burden. I refer to the collection of tolls. Regardless of ownership, this annual expense alone may amount to at least a third of the interest, maintenance, depreciation and capital charges.

Under private ownership you have in addition the demand for a rate of return of from 7 to 8 per cent on the investment, the officers' and directors' salaries, etc. Under public ownership you have interest charges of only 4 to 5 per cent and no extra expense for administration outside of toll collecting.

The public is sometimes slow in making its final decisions. When final decisions are reached, they are about right and do not leave much room for exploitation. The public is perfectly right in rejecting the toll bridge as a part of a highway system. Simply because a short stretch of an important highway system is expensive to construct is no reason why it should not be free the same as the less expensive portions.

Toll roads have practically disappeared in this country. If our entire highway system were under private ownership and toll charges, what a glorious time we would have digging up to pay tolls. Consider the O'Fallon railroad case and the road right-of-way value determined by the fair market value of adjoining lands, on all of which the commissions and courts would tell us to pay 7 to 8 per cent returns for the privilege of moving about.

Charles K. Mohler,
Consulting Engineer.

Chicago, Ill.,
July 8, 1929.

News of the Week

Bids on Mississippi Levee Construction

Bids on two major levee construction projects were opened in Memphis on July 16. The Cancal Construction Company, of Memphis, was low bidder on a contract of 2,175,000 cu.yd. in the upper Yazoo levee district north of Rosedale, Miss., with a bid of 23.83c. per cubic yard. For the White River levee project of 1,170,000 cu.yd., near Helena, Ark., H. B. Blanks, of Vicksburg, offered the lowest bid, 26c.

Bids for the Pecan Point levee section will be opened July 29. It is believed that the controversy over that levee has been settled to the satisfaction of the landowners.

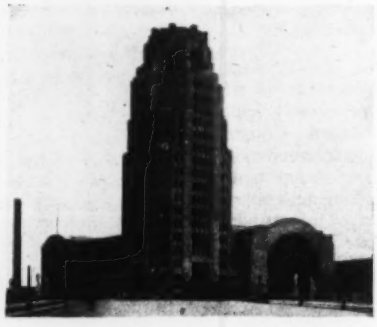
Houston to Get $7,000,000 Passenger Station

Agreement between the city officials of Houston, Tex., and the Southern Pacific Railroad has assured the early construction of a new passenger station in that city which, with other proposed improvements, will cost approximately $7,000,000. Contracts and plans in connection with the project have been approved by both parties. Besides the new station, details of the project include street widening and opening, stream relocation, grade-crossing elimination and other civic improvements. A bond issue of $2,950,000 for this purpose was approved by the voters of the city about a year ago.

Change in Chicago Zoning Law Is Made and Repealed

An amendment to the zoning law of Chicago which permitted buildings to extend to a height of 400 ft. before any offset was made was presented to the City Council by its building and zoning committee without explanation and was passed apparently as a matter of routine. A permit for a 60-story building designed on this basis was granted immediately by the Building Department. Strong objections made by architects' associations, building managers and the zoning board led to an investigation, in which the members of the Council committee stated that they knew nothing of the proposed amendment which had been submitted to the Council by the committee's chairman. The committee at once ordered the Building Commissioner to cancel the permit already granted and not to issue additional permits. According to statements from the city's law department the amendment is void, as it is not drawn to comply with the legal requirements. An injunction suit has been started to prevent cancellation of the permit granted.

BUFFALO'S NEW RAILWAY TERMINAL



This new $14,000,000 terminal of the New York Central Railroad at Buffalo, N. Y., was opened to traffic June 23. The station building is 300 ft. long, 225 ft. wide and 100 ft. high, with an octagonal tower the top of which is 271 ft. above track level. Particular attention has been paid to the elimination of noise and vibration. Foundation pillars are set on mats consisting of alternate layers of asbestos and lead, a device first used in the Grand Central Terminal in New York City. In addition, the walls and ceiling of the concourse are faced with a special type of absorbing tile, and the concrete floor base contains a 2-in. layer of cork.

Contract Awarded for 58-Story Office Building in New York

Contract for the erection of a 58-story building at the northwest corner of Fifth Ave. and 42d St., New York City, has been awarded to Charles T. Wills, 286 Fifth Ave. The building will be erected for Walter J. Salmon, as owner, and is expected to be ready for occupancy in the fall of 1930.

The building will conform in general structural outline to the new style of architecture arising from the setback requirements. It will have a frontage of 100 ft. on Fifth Ave. and will extend about 208 ft. on West 42d St. The first floor will be devoted to stores, and provision for banking quarters will be made on the second floor level. Above the second floor the building will be designed for offices.

U. S.-Mexico Highways to Be Selected at Conference

Highway officials of Mexico have agreed to meet officers of the American Association of State Highway Officials at Laredo, Tex., in November to confer upon points of connection for through international roads. Representatives of each group will be empowered to reach a final agreement at this conference.

Tower on Cableway at Owyhee Dam Destroyed by Fire

Damage reported to amount to $50,000 resulted when the head tower on the cableway spanning the Owyhee dam site in eastern Oregon was destroyed by fire recently. The tower was of timber construction and was designed to travel under its own power back and forth on a track 475 ft. long. The several motors installed in the structure had a total power rating of more than 500 hp. Reconstruction began at once.

Washout Causes Train Wreck in Colorado

Failure of an 85-ft. girder bridge due to the washout of its eastern approach at a small creek near Stratton, Colo., on July 18, caused the wreck of a passenger train on the Chicago, Rock Island & Pacific Railway, resulting in at least nine deaths besides injury to a number of persons. According to report, the two engines and three head cars had crossed when the bridge collapsed and several sleeping cars were wrecked or derailed. Two of the cars were left hanging in the gap, while the sleeper between them was completely submerged and only one of its passengers escaped. The through plate-girder bridge, on masonry abutments, spanned a creek that is usually dry but in which a torrent was pouring as a result of a heavy storm on the upper part of the drainage area. There was no rain along the line in this vicinity, so that the railway had no reason to anticipate trouble, while another passenger train had passed within 45 minutes of the accident, which occurred before daylight. About 200 ft. above the railway bridge was a highway trestle, below which the channel made a reverse curve before passing under the bridge. Instead of following this channel, the flood struck directly at the 25-ft. embankment at the east end of the bridge, washing away the fill and undermining the abutment.

Bauer Succeeds Sloan as N. J. Highway Engineer

Jacob L. Bauer, for many years county engineer of Union County, N. J., has been appointed chief engineer of the New Jersey State Highway Commission to fill the unexpired term of William G. Sloan, which ends April 11, 1931. He will receive a salary of $17,500 per year. Mr. Bauer was born in 1868 and became affiliated with Union County in 1899. Mr. Sloan, as reported in *Engineering News-Record*, June 6, 1929, p. 922, resigned July 15 to become London manager for the Foundation Company.

Little Relief in Prospect for Water Shortage in England

No immediate relief is expected in the severe water shortage in England, according to a cable report from M. N. Baker, associate editor of *Engineering News-Record*, now in England studying water-supply and sewage-disposal developments. Deficient rainfall beginning last January has caused a severe water shortage throughout a large part of England. The Ministry of Health has sent out a general warning to conserve water and the Metropolitan Water Board and other authorities have prohibited the use of garden hose. Some towns are shutting off water all night. Manchester reservoirs contain 26 days' supply. No relief is probable until November, and not then if the low level in the rainfall cycle continues.

Hydro-Electric Project Started in Washington

After two years of preliminary work, workmen have begun to clear the dam site for the North River hydro-electric project to be developed in Pacific and Grays Harbor counties, Wash., by the Western Washington Light & Power Company, a subsidiary of the Federal Light & Traction Company. The entire project will be constructed by Sanderson & Porter. The development is expected to have an important effect upon the industrial expansion of the Grays Harbor and Willapa Harbor areas.

The project calls for construction of a $3,500,000 plant and a transmission line from Aberdeen to Raymond. The dam, 120 ft. high and 400 ft. long at the crest, will contain 54,000 cu.yd. of concrete and will create a reservoir covering 7,600 acres. Below the dam will be two reinforced-concrete buildings, a gate house 75 ft. long and 23 ft. high and a power house in which two 12,500-hp. turbo-generators will be installed, with provision for a third of the same capacity when needed. The transmission line, which will be erected on steel towers and carry 66 kv., will be from 30 to 35 miles long, with two 5½-mile branches.

Bids Asked for Cement for the San Gabriel Dam

Bids will be received on July 29 by the Board of Supervisors of the Los Angeles County Flood Control District for supplying the cement to be used in the construction of the San Gabriel dam. Bids may be made on the total quantity required, which is estimated at the unprecedented amount of 3,442,000 bbl.; on 963,000 bbl., which represents approximately the first year's requirements, and upon 459,000 bbl., representing approximately the first six months' requirements, commencing March 1, 1930. Delivery may be made in bulk f.o.b. cars at the mills or in the yards of the district at Azusa. All proposals require compressive strength of standard sand mortar of 2,500 lb. per sq.in. in seven days, or 3,000 lb. per sq.in. in 28 days.

Deliveries are required to start March 1, 1930, and after the first four months the cement will be wanted at the maximum rate of 90,000 bbl. per month, or an average of 80,000 bbl. for 30 months during the heavy construction period. The last cement is to be delivered in June, 1934.

Gordon Made Managing Director of Electric Railway Association

Charles Gordon, editor of *Electric Railway Journal*, has been selected managing director of the American Electric Railway Association to succeed Lucius S. Storrs, who resigned last April to become chairman of the board of the United Railways & Electric Company, of Baltimore. He will assume his new duties on Sept. 1.

Mr. Gordon has been nationally active in street railway affairs for a long period. After his graduation in 1912 from the department of electric railway engineering at the University of Illinois he saw service with the Chicago transit lines. In 1923 became Western editor of the *Electric Railway Journal* and later was made editor in chief. As editor of the *Journal* he has traveled widely and spoken always in the interest of modernization of local transit service. That his efforts met with success is evidenced by the fact that the *Journal* in 1928 received the first award of a medal offered by the Associated Business Papers to that business paper judged to have given the most outstanding service to its industry.

Five New State-Owned Bridges Authorized in Oklahoma

The new state Highway Commission of Oklahoma has approved five new state-owned bridges in scattered sections of the state. One bridge is to be built across the South Canadian River at Pack Saddle Crossing to connect Roger Mills and Ellis counties. It will cost about $300,000 and will be the only bridge over the river for about 150 miles between Taloga, Okla., and Canadian, Tex. The others are:

Across the South Canadian River between Purcell and Lexington.

Across the Arkansas River at Sand Springs, a suburb of Tulsa. This bridge will cost about $400,000 and will provide a 22-ft. roadway in addition to sidewalks. Tulsa County will pay for half of the project.

Across Caddo Creek, north of Ardmore.

Over Medicine Creek, north of Lawton on the Fort Sill reservation.

Construction of Table Rock Dam Now in Immediate Prospect

A contract settling finally the differences between the Stone County Court and the Empire District Electric Company for the construction of the Table Rock dam and hydro-electric power plant was signed at Galena, Mo., on July 15, and when the Missouri Public Service Commission gives its approval of the construction plans the actual work of building the project will get under way. It will cost complete approximately $35,000,000.

The county had demanded that a bridge be built across Table Rock Lake for Highway No. 43, and the company has agreed to pay $310,000 for the construction of this bridge and $60,000 for other roads and bridges to replace county highways and bridges that will be destroyed by the dam development.

To Check Industrial Pollution of Chicago River

A campaign to reduce the pollution of the Chicago River by trade and industrial wastes has been instituted by the Sanitary District of Chicago under the provision of a law passed in 1927 which gives the district authority to regulate the discharge of such matter into the river. An extended study was made some years ago on methods of treating packing-house wastes and reducing the great amount of solid material dumped into the river by the private sewers of the stockyards section of the city. Whether the responsibility for the cost of such treatment rests with the manufacturers or the Sanitary District is a disputed point now before the courts. The present campaign is aimed particularly at the north branch of the river, which is in an excessively foul condition due to the great variety and amount of trade wastes discharged into it. As a preliminary more than 100 concerns have been requested to permit the sampling and gaging of flow from their private sewers or conduits in order that the character and amount of the effluents may be determined.

Kentucky Highway Commission to Offer Bridge Bonds Again

Measures are being taken by the Kentucky Highway Commission to prepare a set-up that will make possible the sale of $10,678,000 bridge bonds. The commission offered the bonds last May and at that time awarded them to two bond houses. This award was contested and the state Court of Appeals held that the contract was invalid because private negotiations were utilized in effecting the sale and because the commission was without authority to give the successful bidders an option to purchase possible future issues, which had been done.

It is thought that proposals can be drafted on which bids can be asked in accordance with the court's decision.

Threatens to Shut Off Water From Chinook District

All water supplied to the Chinook irrigation district in Montana from the St. Mary's reservoirs will be shut off on Aug. 20 unless a contract for its use shall be signed by the water users, according to orders issued by Secretary of the Interior Wilbur. This culminates a controversy which has been going on for five years under three successive Secretaries of the Interior while water was used without a formal agreement. After years of continual urging, when it was threatened to cut off the water on July 20, gentler methods of persuasion having proved hopeless, the district residents held indignation meetings against this "sudden, high-handed and arbitrary action." Rather than stop the flow in the middle of a growing season, the Secretary gave an extension of a month, within which time agreement is expected. The total payment required is 75c. per acre per year for water use plus $15 per acre for the Chinook interest in the St. Mary's project. Twenty years is allowed for amortization of the latter sum.

Mokelumne Project in California Is Completed

Following a 3½-year construction period water is being delivered from the Mokelumne project of the East Bay Municipal Utility District, Oakland, Calif. The main storage reservoir and aqueduct line are now in operation, although several small additions to the distribution system are still under construction. These are expected to be completed within the next few months.

The East Bay Municipal Utility District, consisting of nine cities on the east side of San Francisco Bay with a combined population of about 500,000, was formed by general election in 1923 to bring an adequate domestic water supply to that district.

The following year a $39,000,000 bond issue was authorized to build the storage and aqueduct portion of the project. The Mokelumne River was chosen as the source of supply, but because of the danger of water shortage the pipe line was started from the delivery end so that, if necessary, an emergency supply could be pumped from a point where the pipe line crossed the San Joaquin River. Construction was not started until August, 1927, on the Pardee dam, 360 ft. high, of gravity type, which contains more than 600,000 cu.yd. of concrete and is now practically finished. The available storage will be 204,000 acre-ft. The pipe line is 95 miles long.

In September, 1928, after the passage in 1927 of an additional bond issue of $26,000,000 to provide a distribution system either by purchase of the properties of the East Bay Water Company, then serving the territory, or by building a duplicate system, the water company's system was bought.

Completion of the project has been accomplished without recourse to the pumping of the emergency supply from the San Joaquin River, but not until the local storage reservoirs were so low that pumps had been installed to make use of the water below the outlets of these reservoirs. The new system has a present capacity of 60,000,000 gal. daily (60 m.g.d.), the tunnels having been built to carry an ultimate capacity of 200 m.g.d.

Repaving Methods in Dispute at Chicago

Resurfacing at cost and resurfacing as an alternative to more expensive reconstruction of street paving in Chicago are matters of controversy between the Department of Public Works and the Board of Local Improvements. Both resurfacing and reconstruction have been handled by the board, but in view of objections to the board's estimates the Department of Public Works has undertaken some resurfacing at cost, the work being done by city forces and paid for directly by the property owners, who deposit the necessary amount with the City Controller. In these cases the cost estimates of the department were considerably lower than those of the board, due largely, it appears, to less extensive treatment. This new system of handling street repair has been checked by a suit for injunction on the ground that the department is required by law to secure a Council order for work which exceeds 15 per cent of the surface of any one block. A bill to authorize the Department of Public Works to handle street resurfacing at actual cost, by agreement with the property owners, was defeated in 1929 by the Illinois Legislature.

Montreal Cantilever Closed

On July 10 the Dominion Bridge Company, superstructure contractor, successfully made the closure of the 1,097-ft. cantilever span of the Montreal-South Shore bridge over the St. Lawrence River. Junction of the steelwork was made at the middle of the suspended span, of which each half had been cantilevered out from the cantilever arm. Wedges moved by screws bearing a large worm-driven nut were fitted in both top and bottom chords at both ends of the suspended span to permit of adjusting the position of the junction ends. The span had been so set as to give about 4-in. opening between the closing members and their connections, and this opening was closed up by the adjusting devices in about four hours' work. The worms of the screw-adjusting nuts were operated by hand.

At present most of the floor system of the cantilever span is in place. The bottom laterals will not be riveted until the concrete floor has been placed; for the present they are bolted with undersized bolts. The South Shore bridge involves about 32,000 tons of steel, about half of which is in the cantilever structure; the trusses of the latter are built wholly of silicon steel.

Brief News

A SUBWAY, 30 blocks long, to cost $2,000,000, is to be built in Santiago, Chile. It will be a double track system, each track in a separate tunnel. The contract has been awarded to a Chilean engineer.

THE CONTRACT for the construction of the municipal airport at Pittsburgh, Pa., has been awarded to the Vang Construction Company for $1,470,379. A description of this proposed airport appeared in *Engineering News-Record*, July 4, 1929, p. 17.

JAY WALKING is again permitted in Chicago, as the City Council, on recommendation of the committee on traffic regulation and public safety, has unanimously repealed the law which imposed penalties on pedestrians who crossed streets against lights.

WORK HAS BEEN STARTED on a million-dollar sewer alteration and railroad grade crossing elimination project in South Akron, Ohio. The work includes depression of sewers under the Thornton St. railroad tracks, where a $200,000 viaduct is to be built.

A NEW TOLL BRIDGE spanning the Mississippi River between North St. Louis and the Illinois side near Marshall, known as the Chain of Rocks bridge, was opened to traffic July 20. The bridge will give speedier ingress to St. Louis for traffic from northern and eastern Illinois.

A RAILROAD TUNNEL 2 miles long and 4,000 ft. above sea level in the Andes Mountains in the Republic of Colombia, South America, has been holed through and it is expected that railroad cars will be running through it in August. The tunnel will do away with much of the loading and unloading of passengers and merchandise hitherto necessary. The tunnel was completed one month ahead of schedule time.

IN A MUNICIPAL ELECTION in Memphis, Tenn., on July 18 bond issues were authorized as follows: for land and buildings for fire department, $300,000; for additions, improvements and equipment at General Hospital, $200,000; for sewer extensions in annexed territory, $100,000; for streets, sewers, drainage and improvements, $850,000; for additional schools and grounds, $1,350,000.

REVISED PLANS for a bridge across the Tennessee River at Henley St., Knoxville, Tenn., have been approved by the Secretary of War. Modifications include the substitution of one 225-ft., one 102-ft. and one 107-ft. spans for one 195-ft. and three 86-ft. spans north of the north channel-span pier; and the substitution of one 226-ft., one 225-ft. and one 107-ft. spans for one 195-ft. and three 86-ft. spans south of the south channel-span pier. Navigation clearances and the location of the structure remain unchanged.

WASHINGTON NOTES

By Paul Wooton
Washington Correspondent

I.C.C. Considering Railroad Consolidation Plan—Study of Streams Throughout Country

THE Interstate Commerce Commission will proceed without further delay to prepare a formal plan for consolidation of the railways into a limited number of systems, as contemplated by the transportation act of 1920. For years the commission has recommended the repeal of this provision of the act, but it has been compelled by circumstances to bow to the legislative mandate. Congress adjourned without taking action after the commission had announced that it would go ahead if no heed were given to its repeated recommendations. Since then several of the principal trunk line railroads have submitted elaborate plans for grouping the railroads into a few large systems dominated by them.

This week Commissioner Claude R. Porter, chairman of the commission's consolidation committee, announced that he has submitted his recommendations for a general plan of consolidation. No hearings will be held on the general plan prior to its promulgation, but these may follow, as the law provides that changes may subsequently be made in the plan from time to time and hearings may be granted at the request of interested parties after it has been issued.

Whether consideration will be given to the pending applications of the railroads prior to promulgation of the formal plan probably will depend on the time required by the commission to reach agreement. There has been no intimation of the nature and extent of Commissioner Porter's recommendations. The commission may decide to hold hearings on the merger proposals independently and in advance of issuance of the general plan, but Commissioner Porter holds that the commission should proceed as rapidly as possible with promulgation of that plan in order that the proposals of the railroads may be considered under that light, since, according to the statute, the plans proposed by the railroads must conform to the formal plan to receive approval.

May Reopen Pier Case

Consideration is being given the application of New York for a rehearing on the War Department's recent refusal to permit further channelward advance of the Hudson River pierhead line, it has been stated by the Secretary of War. The protest of the city was transmitted to the War Department by Mayor Walker, who pointed out that the cost of the extension of the piers shoreward by excavation, as suggested by the army engineers, would be prohibitive.

While of the opinion that inshore excavation would merely be restoring to the river land formerly taken away from it by reclamation work, Secretary Good is disposed to allow the proponents of the project every opportunity of making good their case. After conferring with General Jadwin, Chief of Engineers, the Secretary believes he will be able to come to an immediate decision on whether or not the rehearing should be granted. In the event the case is reopened, it is believed that the best chance the New York dock interests will have to get the order rescinded will be for them to show that there has been some miscalculation in the studies by the Harbor Line Board, which found that longer piers would be unfavorable to the interests of navigation.

Water Shortages

Although a drought of unusual severity occurred this year in England and, to lesser extents, in Shanghai, Cuba and other parts of the world, it is not believed by Weather Bureau officials that the deficiency of rainfall in these places is due to anything extraordinary in climatic conditions. The only part of the United States that has revealed a deficiency of rainfall during recent months is the far Southwest. Arizona and New Mexico, which customarily receive their heaviest rainfall in July and August, report that the precipitation during June and the first part of July has been unusually low. It is reported also that there is a falling off in precipitation in the spring wheat section of the Dakotas and Montana. As nearly always happens in such cases, however, the Weather Bureau has recorded increased rainfall in other locations. Meteorological conditions in England, it is stated, have diverted the rainfall to northern Russia and the Scandinavian countries. In the United States, the dearth of rainfall in the Southwest has been marked by unusually heavy precipitation in the lower Missouri and Mississippi valleys.

William J. Humphreys, meteorologist of the Weather Bureau, who has made recent studies, on the amount of volcanic dust in the atmosphere, does not believe that the veil of this material between the earth and the sun is any heavier this year than it has been during the past ten-year period. Therefore the amount of solar radiation received has remained constant, and rainfall throughout the earth is unchanged in quantity.

Inspection of Projects Made

Secretary Wilbur, of the Department of the Interior, has returned to Washington after a month's trip through the West and has sketched the results of his visit to various projects coming under his supervision. He explained that after the conference of the representatives of various states and of the oil industry in Colorado Springs, brought together under the auspices of the Federal Oil Conservation Board, under the chairmanship of Mark L. Requa, he had inspected the site of the Boulder dam in Black Canyon near Las Vegas, Nev. Dr. Elwood Mead, Commissioner of the Reclamation Service, and R. F. Walter, chief engineer, joined him there. Plans were outlined for the development of a railway line to the dam, and the building of a community for the engineers and workmen near the dam site, and conferences were held with representatives of the various states and municipalities and power companies interested in the contract for the sale of power which must be let before actual work upon the structure is begun. The Secretary announced the policy of preferring to sell falling water as the basis of such contract. This would obviate the necessity of government construction of the power plants. If the plan is adopted the amount which must be guaranteed to the government before construction may be started is reduced to approximately $70,000,000. This figure is to be arrived at by deducting in succession from the total estimate of $165,000,000 fixed in the Boulder dam bill (the estimate was made by the engineering commission headed by Major General Seibert) first, $39,000,000 as the cost of the All-American Canal; next, $25,000,000 as a government advance toward flood control, the repayment of which does not need to be guaranteed; and a further $31,000,000 as the probable cost of the power plants. The All-American Canal is a separate project, upon which the construction of the dam is in no way dependent.

U. S. Rivers Studied

Reports on flood control, power development and irrigation surveys being conducted by the army engineers on 200 of the nation's streams will be available to Congress when it convenes in December. This study, which was authorized two years ago, has been progressing steadily and it is believed that the work will be entirely finished in three years. As the surveys on the important rivers will require more time, the reports to be submitted to Congress next fall will be chiefly on the lesser streams. Prior studies have been carried so far on some of the large rivers, however, that it is expected the reports on these will be available within several months. Examples are the Tennessee River, where exhaustive studies have been made in the accumulation of data bearing on the Muscle Shoals problem, and the Sacramento River, where previous surveys have been made in connection with flood-control plans.

The Columbia River and its tributaries are regarded as the largest single item of the work from the dual standpoint of reclamation and power development. It has been estimated that the potential power development of which this river is capable is 50 per cent greater than all the power now developed from the country's streams.

When Congress authorized the study, an appropriation of $12,322,000 was provided to carry it out. More than 700 civilian engineers, 50 army officers and some of the personnel of the Geological Survey, the Coast and Geodetic Survey, the Reclamation Bureau and the Weather Bureau are employed in the study, in addition to the assistance given by state engineers. The work on the Missouri and the Ohio will be the last to be started, it is stated.

Engineering Societies

CALENDAR

ANNUAL MEETINGS

AMERICAN ASSOCIATION OF ENGINEERS, Chicago; annual meeting, Mexico City, Aug. 26-28.

AMERICAN WELDING SOCIETY, New York; fall meeting, Cleveland, Ohio, Sept. 9-13.

NEW ENGLAND WATER WORKS ASSOCIATION, Boston; annual convention, Portland, Me., Sept. 16-18.

AMERICAN SOCIETY OF CIVIL ENGINEERS, New York; fall meeting, Boston, Mass., Oct. 9-11.

Personal Notes

D. G. NOLTE has been elected city engineer of Mount Pleasant, Tex., by the City Council.

CHARLES E. FOWLER sailed for Paris, July 24, on the "George Washington" for a stay of several weeks, to report on engineering projects in southern Europe and northern Africa.

FRANK A. LEACH, JR., for the past six years vice-president and general manager, Pacific Gas & Electric Company, San Francisco, has resigned, and PAUL M. DOWNING, vice-president in charge of electrical operation and construction, has been named to succeed him.

Major C. P. GROSS, Corps of Engineers, has been relieved from duty as U. S. district engineer at Los Angeles, Calif., and has been assigned to command the 29th Engineers at Fort Humphreys. He will sail probably in September with that unit to undertake the canal surveys in Nicaragua.

F. W. HOFMOCKEL has been appointed manager of port facilities at Baton Rouge, La. In addition to organizing the dock services at Baton Rouge, Mr. Hofmockel is in charge of a campaign looking to the development of water-borne commerce at the Louisiana capital.

JOHN A. BEEMER, who recently completed construction work for the Montague Water Conservation District and Big Springs Irrigation District in Siskiyou County, Calif., is now temporarily employed on storage investigations on West Walker River, Nevada, for the Walker River Irrigation District.

DAVID H. MERRILL, formerly of the firm of Noice & Merrill, structural engineers, Los Angeles, Calif., has been made managing secretary-treasurer of the Pacific Coast Building Officials Conference, with headquarters at 1101 Heartwell Building, Long Beach, Calif.

M. T. HATCHER and ALBERT E. PUGH announce the opening of the Water and Sewerage Laboratories, 1334 Oak St., Kansas City Mo., where they will conduct a general laboratory practice in the field of water purification and sewage treatment. Mr. Hatcher will continue as associate engineer with the Burns & McDonnell Engineering Company.

RALPH H. MANN, formerly assistant to the secretary of the American Society of Civil Engineers, engaged upon coordinating the work of the technical divisions of the society at the society's headquarters in New York, is now field engineer of the American Wood Preservers Association, with headquarters in Chicago. Before joining the staff of the Am.Soc.C.E. Mr. Mann was in civil engineering work in New Orleans.

A. H. FEAGIN, division engineer for the Alabama State Highway Department, who was stricken with paralysis last March while superintending repairs to flood-torn roads so that relief could get through to beleaguered south Alabama towns, has recovered and reported for duty.

E. E. BONEWITS, of Little Rock, Ark., has organized E. E. Bonewits & Company to do a general civil engineering business. Mr. Bonewits was formerly with the William Crooks Engineering Company, of Little Rock, and has practiced as a civil engineer for a number of years.

JAMES COHIG, a civil engineer who was engaged in the building of the Moffat tunnel, has been recalled by the Moffat Tunnel Commission to assist it in valuation work. Engineers from the Interstate Commerce Commission are making a cost investigation, checking the tunnel's value from every angle.

ALDEN CHASE, chief engineer in charge of construction for the St. Louis, Mo., street paving department, has resigned from the city service after 23 years and has organized the Chase Construction Company, to engage in the contracting business in the city street paving field.

J. L. BARRON has resigned as assistant professor of sanitary engineering in the University of Kansas and as assistant engineer of the Kansas State Board of Health to accept a position on the engineering staff of the New York State Department of Health. His place will be taken by R. E. LAWRENCE, formerly with the Kansas State Board of Health and recently city engineer of Chanute, Kan.

ARCH ROBISON has become vice-president and general manager of the Toledo, Bowling Green & Southern Traction Power Company, Findlay, Ohio; the North Baltimore Service Company, and the Wooster Electric Company, all in Ohio. These companies are a part of the Empire Public Service Company's system. Mr. Robison has also been made vice-president and general manager of the Western Ohio Railway & Power Corporation.

CHARLES E. MOORE, JR., has resigned as junior assistant utilities engineer of the Maryland Public Service Commission, effective Aug. 10, to accept a position as planning engineer for the Western Electric Company, which is building a $25,000,000 plant near Baltimore. He has been with the commission since Sept. 1, 1926. Mr. Moore is the third member of the engineering staff of the commission to resign recently. H. CARL WOLF, chief engineer, was the first. LUKE ELLIS is now acting chief engineer. The second was RAY Y. GILDEA, senior utilities engineer.

Obituary

JAMES BEVERLY RISQUE, formerly of St. Louis, Mo., and for the past fifteen years a consulting engineer in the East, died at Stamford, Conn., on July 13.

LOUIS E. BEAN, chairman of the Oregon Public Service Commission, died in Salem, Ore., July 6, following a heart attack. For nearly three years Mr. Bean had served as a member of the commission and during the last two years had been its chairman.

CHARLES N. MCDONALD, vice-president of and manager in Portland, Ore., for the Gilpin Construction Company, died in Eugene, Ore., July 5 at the age of 67. He had been connected with the construction business in Portland for 40 years. While associated with the Portland Bridge & Building Company, which later merged with the Gilpin company, Mr. McDonald erected the dome of the Capitol building at Salem and the Steel and Morrison bridges in Portland.

THOMAS E. MURRAY, inventor, designer of huge electrical power plants and organizer of public utility companies, died in Wickapogue, Long Island, on July 21. He was 68 years old. Mr. Murray designed the electrical power plants which supply the New York metropolitan area and was vice-chairman of the board of directors of the New York Edison Company until he resigned last November owing to illness. It was largely due to his advice that Anthony N. Brady went into the electrical field on a large scale. Mr. Murray's work was not, however, confined to the electrical field. His research was varied and he was the holder of more than 1,100 patents. One of his inventions was a welding process for welding metal to glass. Another welding process invented by him made high-speed production possible in the automobile industry. He received the Longstreth medal of merit from the Franklin Institute of Philadelphia for his electrical discoveries and the invention of many safety appliances. He received much praise from officials of the War Department for his inventions which speeded up the production of munitions during the World War. It was due to one of his welding processes that the government was able to manufacture 240-mm. mortar shells.

Construction Equipment and Materials

Diesel Engine Makers Organize

Twelve of the leading American builders of diesel engines have recently formed the Diesel Engine Manufacturers Association, with headquarters at 30 Church St., New York City, in charge of M. J. Reed, research engineer for the association. The organization has as its primary objects the advancement of diesel power in America and a broad program of co-operation with users of this type of power. Attention will be given to the development of standards of manufacturing and engineering practice, the formulation of specifications for oil fuels, the wider distribution of such fuels and similar objects.

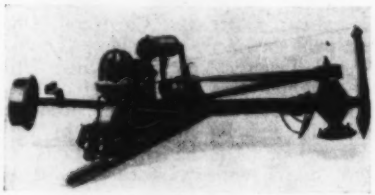
New Developments

Steel Roof Deck Units 6 In. Wide

A light-weight roof deck made of 18 and 20 gage copper alloy steel in depths of 1¼ and 1½ in. and made in units 6 in. wide is a recent product of the Truscon Steel Company, Youngstown, Ohio. It is known as Ferrobord and is designed to be used as a base for any desired amount of insulation or waterproofing materials. Upon the application of insulation it is claimed to present a permanent surface of unbroken smoothness. Each strip is locked to the one on either side of it by a patented groove and flange formed on the strips. Another feature of the unit is that strips are spliced by butt joints which may be made at any point without reference to supporting members. The strips may be run either way of the roof. A patented cleat is used to anchor the insulation to the steel on steep pitched roofs, these cleats being applied without perforations in the steel. Ferrobord comes in strips of any desired lengths and may be used on any shape roof.

Two New Machines for Railway Maintenance

Tie adzing by machine and the surfacing of track with the aid of power-operated jacks are inherent possibilities for railway maintenance work contained in two new machines recently introduced by the Nordberg Manufacturing Company, Milwaukee, Wis. The adzing machine is designed for use when relaying rail. It is claimed to prepare the ties more rapidly and with more accuracy than has ever been possible heretofore. The cutter can be set to adz level or can be canted as desired; in the latter event every tie will have the same cant in relation to the track. The machine travels on three wheels when being pulled to the job. When ready for adzing, the single wheel is swung to the opposite side and acts as a counterweight to hold the cutter up from the ties. In this position, the two roller-bearing wheels on the single rail are held on the rail and in adjustment for adzing by four ball-bearing adjustable roller guides. The cutter head, driven by a gasoline engine through a belt, is similar to a vertical milling tool with seven or more adjustable ½-in. square steel bits rotating at 1,500 r.p.m. The standard cutter head cuts a groove 12 in. wide, but different diameter heads can be supplied. In the center of the revolving cutter is a plate 3 in. in diameter, set at the same height as the edges of the cutting bits. This plate is the gage which, when coming in contact with the seat left by the old rail in the tie, prevents adzing deeper than this level. It is claimed that spikes or gravel do not harm the cutter, one cutter head having run for an hour and a half, striking 25 spikes without any harm being done to the bits.



TIE ADZING MACHINE

POWER TRACK JACK

The power jack is designed for raising track on ballasting and re-ballasting jobs and for doing it much more rapidly than by the use of ordinary hand jacks. The machine is light enough to be removed from the track by six or eight men. It is not intended for heavy grade raising but for short lifts or for raising grade under traffic where the track must be kept in condition for ordinary train service. It is designed as a power jack on which only one man is required and which will do the raising for a gang of 50 to 80 tampers. Both rails can be lifted at the same time, either rail lifted independently of the other, or one rail raised and the other lowered at the same time. Clamping is a task of only a moment's time, according to the manufacturer.

ARMY ENGINEERS BUILD WELDED STEEL BOATS

As the result of tests extending over a year, the Corps of Engineers of the U. S. Army has approved and is building a fleet of arc-welded steel motor launches for use as carriers and towboats on the Mississippi River and its tributaries. Each boat is constructed entirely of steel, all permanent connections being made by the electric arc-welding process. Temporary bolts are used in assembly, and the rear end of the forward bulkhead is riveted to facilitate removal. The over-all length of the craft now being built is 28 ft., the beam 7 ft., and the depth 2 ft. 4½ in. The boats are designed for shallow draft, having flat bottoms, slightly stepped at the stern and with a sharp rise at the bow. Six-cylinder, 125-hp. gasoline motors are mounted on a welded base made of ¼-in. steel plates. A 3:1 reduction gear is used, giving a speed of 13 miles per hour, when running light. The illustration shows a complete hull with engine mounted, before fittings and equipment have been installed. The bumpers shown at the bow are for pushing barges.

Interlocking Safety Hook for Crane Service

An invention that provides unusual safety for all general purposes where hooks are required is being marketed by the Public Works Equipment Company, Inc., 1776 Broadway, New York City. It is known as the Anderson safety hook. The hook is formed of two members pivotally connected together and attached to a swivel, each

SAFETY HOOK PREVENTS ACCIDENTS

member comprising a shank formed at one end with a hook and at the other end with an eye, the hooked ends being turned at right angles to the eye and so located as to form an interlocking link. A recess in the inner face of one shank registers with a recess in the other shank, thereby providing a smooth surface to the hook, which consequently cannot foul or snare projections or obstructions at any time, whether the hook is carrying a load or running free.

The flared lips at the bottom of the hook provide a sure and quick method of attachment to any load, and a half-turn of the hand releases the attachment when the hook automatically returns to closed position.

Business Notes

FOGLE-HELSBY COMPANY, Seattle, Wash., has been formed by William I. Fogle and George E. Helsby. The new company will deal in fabricated structural steel, forgings, tanks, pipe, steel plate work, hammerhead cranes, lumber stackers and grapples, and will be Northwest representative of the Northern Engineering Works, of Detroit, the Ames Iron Works, of Oswego, N. Y., and the Schwartz Engineering Company, of Denver, Colo.

M & M WIRE CLAMP COMPANY, Minneapolis, Minn., has completed an arrangement to do its own manufacturing by the purchase from the Bowen Products Corporation of its Minneapolis manufacturing plant. This plant has been manufacturing M & M products for a number of years on a contract basis.

BEAUMONT MANUFACTURING COMPANY, Philadelphia, Pa., has appointed J. W. Hemmerle, formerly with the Blaw-Knox Company, general sales manager of its bin and batcher division. His assistant will be George E. Furnival. The company also announces the appointment of a number of agents, as follows: Stuart M. Christhilf Company, Baltimore, Md.; George E. Hoppe, Richmond, Va.; Charles H. Ineson, Rochester, N. Y.; B. W. Ranson, Detroit, Mich.; Brown & Sites Company, New York City (for export only); and Gesner Contractors Equipment Company, New Haven, Conn.

FULLER LEHIGH COMPANY, Fullerton, Pa., is producing a new grade of chilled-iron castings developed by J. S. Elverson, metallurgist for the company. This product will be known by the name of Elverite.

PERFEX CORPORATION, Milwaukee, Wis., announces the appointment of G. W. Foote as factory manager.

New Publications

Explosives—E. I. DU PONT DE NEMOURS & COMPANY, Wilmington, Del., has listed all issues of the *Explosives Service Bulletin* in a pamphlet recently issued. Since 1923 the company has issued 77 bulletins treating various phases of the use of explosives, all of which are still in print. The pamphlet forms an index of these, both by subject and by date.

Wood Preservatives — GRASSELLI CHEMICAL COMPANY, Cleveland, Ohio, has published a 38-p. booklet, "Looking Ahead Twenty Years in Wood Utilities," which treats of the principles of wood preservation and describes zinc chloride and its application in wood preserving. Of the two sections, the first opens with a discussion of the causes of rot in wood and its prevention under various conditions of service. Section 2 gives considerable detail as to methods of treatment and properties of zinc-treated wood.

Construction Practice — PORTLAND CEMENT ASSOCIATION, Chicago, Ill., has issued a new edition of its 48-p. illustrated booklet "Concrete Masonry Construction," which gives full details regarding good practice in the construction of walls, roofs, floors and stucco of portland cement masonry. Specifications and many detailed drawings are also included.

Hangar Doors — TRUSCON STEEL COMPANY, Youngstown, Ohio, describes steel doors for airport hangars in a new catalog just issued.

Building Methods—LESLIE G. BERRY, Charlotte, N. C., has prepared a 32-p. booklet describing the Berry method of constructing fireproof buildings, which involves the combination of steel columns with a concrete floor system. This patented method, which may be used by any structural engineer under license, calls for the erection of steel columns several floors in advance of the floor system, the bracing of these columns by temporary steel struts which support formwork, the casting of the floor system and the removal of the temporary struts for use higher up in the building.

Construction, Labor and Material

E. N.-R. Index Numbers

Cost		Volume	
July 1, 1929	**204.77**	**June, 1929**	**347**
June 1, 1929	205.65	May, 1929	395
July 1, 1928	206.65	June, 1928	308
Average, 1928	206.78	Average, 1928	287
Average, 1927	206.24	Average, 1927	263
1913	100.00	1913	100

This Week's Contracts

Heavy construction contracts, reported by *Engineering News-Record* in the week of July 25, with some comparisons, total as follows:

(In Thousands of Dollars)

	July 25, 1929	July 18, 1929	July 26, 1928
Building:			
Industrial	$7,057	$4,788	$3,955
Commercial	33,847	38,053	30,080
Streets and roads	19,155	15,909	8,419
Other eng. constr.	20,990	22,743	9,924
Total	$81,049	$81,493	$52,378
Total, all classes, Jan. 1 to July 25:			
1929			$2,548,067
1928			2,030,051

Sharp Drop in May Capital, but Half-Year Is Record

May financing totaled $1,512,000,000 and broke all records. The June figure is $790,000,000. Although this is a drop of 48 per cent, the total compares favorably with those of other Junes. This is especially the case when refunding issues are substracted. Those in June amounted to only $16,676,000, or one-fourteenth the value of refunding issues in June, 1928. Domestic corporate issues aggregate the same as a year ago. Municipal bonds, though of smaller value than in May, exceed the values of other Junes except that of 1927.

The net total for the half-year is $5,371,000,000, the highest ever, exceeding other years in percentages as follows: 1928 by 30; 1927 by 29; 1926 by 50. The proportion of common stocks to total corporate domestic securities in the last three years is 51 per cent this year, 26 last and 15 in 1927. Municipal bonds are lowest in five years.

Some recent July municipal offerings are listed below:

	Amount	Interest	Yield
Gary, Ind., park improvement	$350,000	4½	4.40
Jackson Co., Mo.	1,500,000	4½	4.40@4.60
Kearny, N. J., water and improvement	1,799,000	5	3.50@4.75
Mamaroneck, N. Y., Union Free School Dist. No. 1	200,000	4.90	4.90
Muskegon Heights, Mich., School Dist. No. 1	315,000	4½	4.85@4.60
Owensboro, Ky., sewer	1,200,000	5	4.85
Richmond, Va.	2,550,000	4½	4.50
	1,550,000	4½	4.40
	750,000	4½ and 5	
St. Clair Co., Ill., East St. Louis School Dist. No. 189	350,000	4½	4.70
	400,000	5	
Union Township, N. J., improvement	900,000	6	5
Utica, N. Y., public improvement	578,000	4½	4.50@4.25

CONSTRUCTION NEWS

Some of the Week's Large Projects

AMONG the announcements for the current week are the following:

Proposed Work

Gas pipe line, Texas and Illinois, Texas Co., et al., Houston, Tex., and New York. Est. $15,000,000.

Office, Chicago, Ill., I. P. Florsheim, sketches, $12,000,000.

Fertilizer plant, Trail, B. C., Consolidated Mining & Smelting Co. of Canada, $7,500,000.

Bridge, Pittsburgh, Pa., Allegheny Co., $3,540,000.

Manufacturing, etc., Chelsea (br. Boston), Mass., Inter-Continental Pipe & Mining Co., New York, $3,000,000.

Terminal, Montreal, Que., Canadian Pacific R.R., Montreal, est. $3,000,000.

Office, Phila., Pa., U. S. National Realty Co., $3,000,000.

Bank, Toledo, O., Mills, Rhines, Bellman & Nordhoff, architects, soon let contract for Ohio Savings & Trust Co., $3,000,000.

Exchange, etc., Louisville, Ky., Southern Bell Telephone & Telegraph Co., sketches, total est. $2,500,000.

Office, Hartford, Conn., State, est. $2,250,000.

Resort, Mississippi, Owner, c/o Allen, Cannon & Urling, Oakland, Calif., sketches, $2,000,000.

Hotel, Sioux City, Ia., Sioux City Business Men, C. Schimmel, Omaha, Neb., sketches, $1,500,000.

Hotel, Sioux City, Ia., Eppley Hotel Co., Omaha, Neb., soon takes bids, $1,200,000.

Art museum, Kansas City, Mo., William Rock Hill Trust, $1,000,000.

Hospital, Clayton, Mo., St. Louis Co., soon takes bids, $1,000,000.

Head house, etc., Chicago, Ill., One Hundred Twenty-Fourth Regiment Field Artillery, $1,000,000.

Theatre, Outremont, Que., United Amusement Corp., Montreal, $1,000,000.

Paper plant, New Westminster, B. C., Westminster Paper Co., $1,000,000.

Masonic temple, Baltimore, Md., C. H. Osborne, structural engr., bids in August general contract for Scottish Rite Masons, $1,000,000.

Rayon plant, Hopewell, Va., American Chatillon Corp., New York, and Tubize Silk Co., New York, sketches, to exceed $1,000,000.

High school, Maywood, Ill., Proviso Township High School Dist., $1,000,000.

Apartment, Chicago, Ill., J. Fisher, $1,000,000.

Bids Asked

Coking plant, Port Stanley, Ont., S. B. Everson, engr., Buffalo, N. Y., taking bids for Dominion Gas Co., Hamilton, Ont., $3,000,000.

Sewers, Peoria, Ill., Aug. 6, by Bd. Directors, Greater Peoria Sanitary & Sewerage Disposal Dist., $1,500,000.

Sewers, Arlington Heights, Ill., Aug. 6, by Village, $1,301,424.

Public Bond Elections, coming and decided, are listed on Construction News page 45.

Office, Los Angeles, Calif., Banks-Huntley Co., taking bids $1,000,000.

Bids Received

Waterworks, Detroit, Mich., Dpt. Water Supply, substructure from Kerpen Constr. Co., Cincinnati, O., $1,539,127.

Contracts Awarded

Office, New York, N. Y., W. J. Salmon, to C. T. Wills, New York, est. $10,000,000.

Cable line, Missouri, Southwestern Bell Telephone Co., St. Louis, by own forces, $7,000,000.

Hotel, Long Beach, Calif., Ocean Ave. Holding Co., to Thebo, Starr & Anderson, San Francisco, $2,000,000.

Apartment, Chicago, Ill., architects, masonry and carpentry to C. E. Erickson, and cut stone to E. E. Skoglund, both Chicago, for C. A. Carlson, Chicago, est. $2,000,000.

Factory, East Hartford (br. Hartford), Conn., Pratt & Whitney Aircraft Co., Hartford, foundation to R. S. Bent Co., Hartford, total est. $2,000,000.

Airport, Pittsburgh, Pa., H. O. Woodside, controller Allegheny Co., to Vang Constr. Co., Pittsburgh, $1,470,379.

Paving, Newport Beach, Calif., to Underground Constr. Co., Los Angeles, $1,110,950.

Government building, Santiago, Chili, Republic of Chili, to Fred T. Ley Co., New York, est. $1,000,000.

Office, New York, N. Y., C. Vanderbilt, New York, separate contracts, $1,000,000.

Construction News of the Week

WATERWORKS

Proposed Work

Ala., Alabama City—For 17,000 ft. 6 in. and 6,000 ft. 8 in. mains, $27,500. J. B. McCrary Co., Citizens & Savings Bank Bldg., Atlanta, Ga., engrs.

Calif., Sacramento—H. S. Denton, city clk. soon takes bids 215 ft. 60 in. steel by-pass line in connection with filtration plant, $25,000. B. C. Clark, city engr. Noted Mar. 14.

Fla., Daytona Beach—See "Sewers."

Ill., Decatur—Mains in Southmoreland Pl., East Condit St. from Jordan to Folk Sts. $15,259. M. P. O'Brien, City Hall, engr.

Ill., Riverside — Well, pumping station, $100,000. Marr, Green & Co., 400 North Michigan Ave., Chicago, engrs.

Mich., Detroit—Wayne Co. Rd., Comn., 17,900 lin.ft. 12 in. c.i. mains in Middle Belt Rd.

Mich., Trenton—Extending 6,130 ft. 6 in. c.i. mains, with valves, specials, $20,000. L. A. Doan, Municipal Bldg., engr.

Miss., West Point — Waterworks improvements. To exceed $15,000. Burns & McDonnell Eng. Co., 402 Interstate Bldg., Kansas City, Mo., engrs.

N. J., Hoboken—Bd. Council, Boro Hall, constructing, extending mains in Hollywood Ave. $15,000. F. Evans, Boro Hall, engr.

N. Y., New York—J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., rejected bids July 9, main in Bronx Zoological Park. Noted July 4.

N. C., Newton — Soon takes bids extending waterworks, sewerage systems, $50,000. Spoon & Lewis, Jefferson Bldg., Greensboro, consult. engrs.

Okla., Tecumseh—New water supply, $40,000. Long & Co., 1300 Colcord Bldg., Oklahoma City, engrs.

Tex., Ballinger—City, c/o W. C. McCarver, mayor, extending waterworks, $75,000. H. E. Freese, 411 Capps Bldg., Ft. Worth, engr. Noted July 4.

Tex., Jasper—City, c/o G. Smith, mayor, wells, distribution system, $250,000. C. P. Hunter, Jasper, engr.

Ont., Brampton—For 35,900 lin.ft. 4 in. c.i. mains with 6 and 8 in. mains, $90,000. F. A. Early, waterworks supt.

Bids Asked

Ark., Russellville—See "Contracts Awarded."

Calif., Oakland—Aug. 14, by J. H. Kimball, secy. East Bay Municipal Utility Dist., sixteen 6- to 24-in. gate valves and sluice gates, 4½ tons standard c.i. fittings, miscellaneous steel, brass piping, structural steel parts, other items for enlargement Upper San Leandro Filter Plant.

Ill., Mt. Prospect—See "Sewers."

N. Y., Scotia—Aug. 1, by H. Toll, village clk., improving waterworks. H. W. Taylor, 11 Park Pl., New York, engr.; adv. E. N.-R. July 25.

Tex., Dayton—Aug. 1, by W. S. Neel, mayor, waterworks, $40,000. H. L. Thackwell, Jacksonville, engr.

Wis., West Allis—July 30, by Bd. P. Wks., J. L. Ferebee, comr., 1 m.g. elevated steel tank, 77th and National Sts. W. Darby, West Allis, engr.

THESE reports are grouped under each class (water-works, sewers, etc.) and under each stage of the work (proposed, bids asked, etc.) according to the alphabetical order of states.

Where name of official is not given inquiries should be addressed to City Clerk, County Clerk, or corresponding official.

B. C., Vancouver—Aug. 1, by E. A. Cleveland, engr., 500 Beatty St., 30,000 ft. 26 to 32-in. rivetted steel pipe, valves, for water Dist. Greater Vancouver. $200,000.

Bids Received

Mass., Boston—At office Metropolitan Dist. Water Supply Comn., diversion dam and intake substructure at Shaft 8 Wachusett-Colebrook Tunnel, from J. W. Bishop Co., 109 Foster St., Worcester, $213,077. Noted June 20.

Mich., Detroit—Dpt. Water Supply, substructure for filtration plant at Spingwells Station, from Kerpen Constr. Co., 123 Valencia St., Cincinnati, O., $1,539,127. Noted June 20.

N. Y., Brooklyn—J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, July 16, mains in Avenue P., 3rd, 17th, 23rd and Myrtle Aves., from Empire Contg. Co., 21 Park Row, New York, $14,580. Noted July 11.

N. Y., St. George—J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, July 16, mains in Henderson, Rathbun and Stafford Aves., from Empire Contg. Co., 21 Park Row, New York, $18,890. Noted July 11.

N. Y., Wanakena—Dpt. Educ., Education Bldg., Albany, July 11, water supply at New York State College of Forestry, St. Lawrence Co., from Williamsbridge Constr. Co., 740 Williamsbridge Rd., New York, $34,487. Noted June 20.

O., Cleveland—Comrs. Cuyahoga Co., July 10, 9,000 ft. 6- to 16-in. c.i. main in Westwood Ave., Impvt. 657, from Essi & Haddad, 2196 West 100th St., $49,822.

Contracts Awarded

Ark., Russellville—Arkansas Power & Light Co., Pine Bluff, 500,000 gal. filtration plant, extending distribution lines, own forces, $85,000. Private plans.

Calif., Arroyo Grande—City, c.i. water supply lines, to G. E. Rue, Santa Barbara, $7,700; 80 x 100 ft. rein.-con. reservoir, to W. Lane, Paso Robles, $15,254. Noted June 20.

Calif., Burbank—F. S. Webster, city clk., 2½ m.g. reservoir, to Whipple Eng. Co., 183 North Madison St., Monrovia, $28,860. Noted June 27.

Kan., Topeka—For 30,650 ft. 6- to 12-in. c.i. mains, to Kirkham & Kailmer, 1460 Pembrook Lane, $43,739.

Md., Baltimore—Mayor and City Council, mains in York Rd., to M. & J. B. McHugh, 3716 Sequoia Ave., $25,548.

Mich., Detroit—Dpt. P. Wks., brick, concrete pumping station, to R. A. Hidex, 7-246 General Motors Bldg.; 2 motor driven vertical centrifugal pumps, to American Well Works, Aurora, Ill., $19,861.

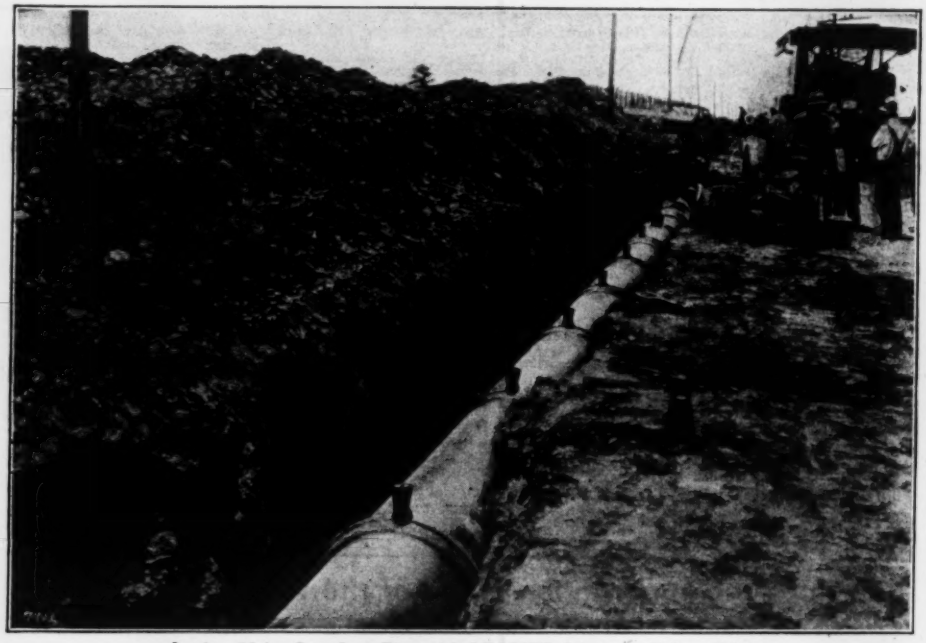
Miss., Houston—Waterworks, to Paulglaze & Bassenberger, Birmingham, Ala., $45,000. Noted June 27.

N. Y., Brooklyn—J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, main in Atlantic Ave., to Empire Contg. Co., 6 Church St., New York, $10,095. Noted July 4.

See proposal advertising on page 123

Constr. News page 39

LEADITE



Laying 36-in. Cast Iron Pipe with LEADITE Joints, in Tulsa, Okla.

Well-known Southwestern Contractor *uses* LEADITE *for Severest Conditions*

The Standard Paving Co., Inc. of Tulsa, Oklahoma, have used LEADITE in jointing 26 Miles of cast iron pipe throughout the State,—and are very well satisfied with the results.

Of the total 26 Miles laid by this Firm, 6 miles were laid right in the city of Tulsa, while the remaining 20 miles were in various other parts of the State. The Tulsa lines are of 24-in., 30-in. and 36-in. diameter, and are subject to extremely high pressures for lines of their type. The LEADITE Joints SHOWED "NO LEAKAGE,"—and the lines were laid in the hottest months of the year.

The remaining 20 miles of cast iron water mains laid by this firm, varied in size and pressure,—and the LEADITE Joints were "equally satisfactory."

In speaking of the performance of LEADITE, we quote from the concluding paragraph of a recent letter from the Standard Paving Co., Inc.:

"—it seems that a LEADITE Joint will at least develop the full strength of cast iron pipe, and is less susceptible to leaky joints, and we would have no hesitancy in using LEADITE for the severest conditions."

The Pioneer self-caulking material for c. i. pipe.
Tested and used for over 30 years.
"Saves at least 75%"

THE LEADITE COMPANY
Land Title Building Philadelphia, Pa.

No Caulking

Waterworks (Continued)

N. Y., Brooklyn—J. J. Dietz, comr. Water supply, Gas & Electricity, Municipal Bldg., New York, mains in Avenues J, M, P and Q, to Manhattan Water Works Co., $12,222; Atlantic and Foster Aves., to Draganetti Contg. Co., 711 East 228th St., New York, $17,143. Noted June 27.

N. Y., New York—J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., mains in Eastchester Rd., to Knight & DeMicco, Inc., 148 East Tremont Ave., $10,264. Noted June 27.

N. Y., Ossining—Water Comrs., Municipal Bldg., 300,000 gal. steel reservoir, to Pittsburgh-Des Moines Steel Co., 50 Church St., New York, $18,140. Noted June 20.

N. Y., Scarsdale—A. Boniface, village engr., Village Hall, foundations for Martello Tower, to Doyle & Daly, Arlington Ave. and 232nd St., New York. Noted July 4.

O., Brooklyn (br. Cleveland)—Village, c.i. mains in 12 streets, to Kassouf & Co., 3182 West 25th St., Cleveland, $54,000. Noted

O., Gates Mills (br. Cleveland)—Mains in Gates Mills Blvd., east side, to Ciraci Constr. Co., 602 The Arcade, Cleveland, $30,165; west side, to Haddad-Mall Co., Hanna Bldg., Cleveland, $29,750.

O., Pepper Pike (br. Cleveland)—Mains in Gates Mills Blvd., Sect. 1 and 2, to Iafornaro-Galitta Co., Citizens Bldg., Cleveland, $20,234 and $30,194 respectively; Sect. 3, to J. B. Lynn Constr. Co., 16311 Saranec Rd., Cleveland, $13,977; Sect. 4, to Haddad-Mall Co., Hanna Bldg., Cleveland, $20,593. Grand total $84,998.

Okla., Granite—Triplex pump, motor, 14,300 ft. 8 in. c.i. pipe extension, to C. Robeck Co., 408 Securities Bldg., Omaha, Neb., $27,428. Est. $35,000. Noted May 9.

Tex, Rio Grande—Central Power & Light Co., Frost Bldg., San Antonio, 1 story, 500,000 g.p.d., rein.-con. filtration plant, $40,000. Owner builds. Noted May 30.

Wis., Milwaukee—Dpt. P. Wks., R. E. Stoelting, comr., 1,832 ft. 12, 36 and 42 in. c.i. mains in Hawley Rd., to Werner Co., 721 8th Ave., Wauwatosa, $18,832; 3,297 ft. 8- to 36-in. c.i. mains in Fairview Ave., to Wenzel & Henoch, 5025 State St., $20,626.

Wis., Milwaukee—Dpt. P. Wks. R. E. Stoelting, comr., mains in 58th St., to Ribbens Bros., 1982 Woodburn St., $7,210; 35th St., to Wenzel & Henoch Co., 5025 State St., $8,692.

Ont., Leamington—Town, for 1,200 imp. g.p.m. 3 stage centrifugal pump, d.c. to electric motor one end and gasoline engine at other end, to Turbine Equipment Co. Ltd., 73 King St. W., Toronto. Est. $8,000. Noted July 4.

Ont., Toronto — Rein.-con. reservoir, 600 ft. rein.-con. high level bridge, at St. Clair Ave. W., and Spadina Rd., to Nelson River Constr. Co., 124 Pears Ave., $903,002.

SEWERS

Proposed Work

Calif., Los Angeles—Los Angeles Co., 5.72 mi. sewer in Union Ave. 170th and Illinois Sts., C.I. 765. $54,648. W. F. Foster, Hall of Records, engr.

Colo., Colorado Springs—S. E. Nicholas, city clk., soon takes bids sewer line from 37th St. to southern edge of city. $85,000. F. O. Ray, city engr.

Fla., Daytona Beach—Sewer, watermains, paving on Burgoyne Isle. Issuing $120,000 time warrants for same. E. Wheeler, city mgr.

Ill., Alton—Soon takes bids 17,480 ft. 6 and 8 in., vitr. clay and 100 ft. 6 in. c.i. sewers, 50 manholes in Salu Sewer Dist., $26,060. C. F. Abraham, City Hall, engr.

Ill., Franklin Grove—Sewage disposal plant, 6 mi. sanitary sewers. $85,000. Marr, Green & Co., 400 North Michigan Ave., Chicago, engrs.

Okla., Carmen—New sewage disposal plant, $25,000. C. H. Guernsey, Cherokee, engr.

Mich., Huntington Woods—Village, 8,790 ft. 12- to 42-in. lateral sewers in Assessment Dist. 4. $30,000. Pate, Bacon & Hammann, 922 Transportation Bldg., Detroit, engrs.

Mich., Royal Oak—For 8,175 ft. 12- to 24-in. concrete or vitr. combined sewer in Dist. 20, $30,000. Hoad, Decker, Shoecraft & Drury, Ann Arbor, engrs.

Mich., Trenton—Village, 5,360 ft. 10- to 36-in. storm and sanitary sewers, pumping station, septic tank. $45,000. L. A. Doan, village engr.

N. J., Lodi—Bd. Council, Boro Hall, preliminary plans trunk sewerage line into Passaic Valley sewerage line. $50,000. A. Noack, 236 Main St., Hackensack, boro engr.

N. J., Margate City—Bd. Council, City Hall, preliminary plans underground storm drainage system in Atlantic Ave., from Cedar to Coolidge Ave. and Ventnor Parkway. $25,000. E. D. Rightmire, city engr.

S. C., Charleston—City selling $125,000 refunding sewerage bonds Aug. 1. W. S. Smith, city treas.

N. C., Greensboro—See "Waterworks."

Tex., Austin—City, c/o A. R. Johnson, mgr., 4,800 ft. sewer, incl. laterals, 5 ft. x 4½ in. concrete boxes, 24 in., 30 in. and 36 in. concrete pipe, east of East Ave. $25,000. H. R. F. Welland, consult. engr., C. G. Lavender, sewerage engr.

Tex., Cotulla — City, c/o H. H. Wildenthal, mayor, surveys, sewerage system. F. J. Von Zuben, 61 Dan Waggoner Bldg., Ft. Worth, engr.

Ont., Grimsby—For 8 in. and up vitr. tile sewers in Adelaide, Depot, Elizabeth, Elm, Doran, Gibson, Mountain, Oak, Robinson and Victoria Sts. $100,000. G. G. Bourne, town engr. F. A. Dallyn, 71 Kingston St. W., Toronto, consult., engr. Noted July 11.

Bids Asked

Colo., Cortez—Aug. 17, by T. Duncan, city clk., sewerage system, disposal plant, $25,000. Douglass & Thwaits, Continental Oil Bldg., Denver, engr. Noted June 13.

Ill., Arlington Heights—Aug. 6, by Village, sewers, flume, sewage treatment plant, also dredging creek, $1,301,424 available. W. H. Allen, 1484 Miner St., Des Plaines, engr; adv. E. N.-R. July 25. Noted Nov. 22.

Ill., Peoria—Aug. 6, by Bd. Dirs. Greater Peoria Sanitary & Sewerage Disposal Dist., E. C. Mays, pres., sewage disposal plant near connection Kirkwood Creek and Illinois River, incl. pumps, conduits, piping, sluice gates, grit removal, primary settling, artesian and final tanks, 3,000,000 lb. reinforcing and structural steel, pumping station, shower house. $1,500,000. Pearse, Greeley & Hansen, 6 North Michigan Ave., Chicago, engrs.

Ill., Peoria—Aug. 12, by Bd. Trustees Greater Peoria Sanitary Sewage Disposal Dist., Div. G, Middle Section Intercepting Sewer. Former bids rejected Pearse, Greeley & Hansen, 6 North Michigan Ave., Chicago, engrs. Noted May 30.

Ill., Mt. Prospect—July 30, by Village, sewers in Candota Ave., $20,600, waterworks in same, $10,100. Consoe, Older & Quinlan, 222 North Wells St., Chicago, engrs.

Mass., Boston—July 30, by Dpt. P. Wks., sewerage works in streets in Hyde Park and West Roxbury $25,000. J. H. Sullivan, comr.

Md., Towson—Aug. 5, by Bd. Comrs. Baltimore Co., Contr. 17-S, sewers in streets in Overlea; Contr. 18-S, along Red House Run, South from Hazlewood Ave.; Contr. 19-S, streets in Catonsville. B. L. Crozier, Courthouse, ch. engr.

Neb., Hemingford—July 29, by G. C. Pierce, city clk., 8,000 ft. 12 in. outfall, 4,950 ft. 10 in. main, 13,750 ft. 8 in. lateral sewers, 536 wyes, 63 manholes, 5 standard and 1 special flush tanks, sewage disposal plant. $48,913. Henningson Eng. Co., 326 Union State Bank Bldg., Omaha, engrs. Noted Nov. 1.

Neb., South Sioux City—Aug. 2, by City Clerk, 60,000 ft. 18 in. concrete sanitary sewers, 2 pumping stations in James and Randolph Sts., $110,030. W. E. Buell & Co., Insurance Bldg., Sioux City, Ia., engrs. Noted July 11.

N. Y., Collins—Aug. 12, by office Executive Dpt., Div. Standard & Purchase, Capitol, Albany, sewers, water lines, at Thomas Indian School, Iroquois; adv. E. N.-R. July 25.

N. Y., New York—July 31, by J. Miller, pres. Manhattan Boro, Municipal Bldg., improving sewer in Pine St.

N. C., High Point—Aug. 14, by C. A. York, mayor, and City Council, sewage disposal plant, appurtenances. William C. Olsen, Inc., Raleigh, consult. engrs.; adv. E. N.-R. July 25.

O., Canton—Bd. Control bids about Oct. 16, sanitary sewers in 9 streets. $28,000-$30,000. W. E. Sarver, Canton, engr.

O., Cleveland—July 31, by Bd. Coms. Cuyahoga Co., 8,400 ft. 15- to 60-in. sewers in Brookpark and Stumph Roads. W. J. Rogers, Court House, engr.

Pa., Reading—July 31, by City Council, reconstructing sewage treatment plant. E. C. Weber, city engr.; adv. E. N.R. July 25.

Ont., Riverside—July 29, by J. C. McHugh, town clk., constructing Contrs. A, B, C and D, sewerage system. G. G. Reid, Riverside Town Hall, engr.

Ont., Toronto—July 30, by S. McBride, mayor, vitr. tile sewers in Douglas Dr., Glen Rd., Concord, Landsdowne, Leuty and Lee Aves.; vitr. tile and concrete sewer outlets, Shaw St., Rusholme, and Waverly Rds., Roncesvalles and Logan Aves. $60,000. R. C. Harris, City Hall, engr.

Bids Received

Calif., Glendale—For 31,352 ft. 8 and 10 in. sewer in Longview Dr., from J. Artukovich, 684 East 58th St., Los Angeles, $42,940.

N. J., Bergenfield—Bd. Boro Council, Boro Hall, July 8, sewers, sewage lift station, from Burns & Hall, Park Ave., Dumont, $119,313. Noted June 13.

N. J., Union—Twp. Com., Twp. Hall, storm sewer Chestnut St., from J. Abbott, Inc., 19 Claremont Ave., Montclair, $14,633. Noted May 16.

N. J., West Paterson—Mayor and Boro Council, School 1, July 5, Sect. 1 sanitary sewerage system, from J. Susino, 37 Danforth Ave., Paterson, $24,070; Sect. 2, from C. Alberto, Oxford St., Paterson, $41,190; Sect. 3, from C. M. Brestow, Market St., Paterson, $14,178. Noted June 20.

N. Y., Brooklyn—J. J. Byrne, pres. Brooklyn Boro, Boro Hall, July 17, sewers in West 5th St., from Vacaro & Fornaro, 67.39% est $28,608; 74th St. and De Witt Ave., from Mammill Constr. Co., 1780 Pitkin Ave., 89.4% est. $3,828 and 85% est. $2,000 respectively; Hawthorne St., from B. Picone & Son, 18th St. 80% est. $3,821; East 17th St., from Del Mel Constr. Co., Inc., 7624 15th Ave., 70.5% est $2,204; 90th St., from F. B. Cassidy, 90% est $1,260; Williams Ave., from Ferbon Constr. Co., 88.59% est. $250. Noted July 11.

N. Y., Long Island City—J. J. Halleran, acting pres. Queens Boro, Queens Subway Bldg., July 12, from Doric Holding Corp., sewers in 7th St., $38,540; from Lione Constr. Co., Laurel Hill Blvd., $7,051; from J. H. Johnson, 37 Brighton Ave., Elmhurst, 63rd St., $19,161, Monroe St. $10,043, Oceania St. $53,596; from Kennedy & Smith, 25th Ave. $15,687; from D. A. Gross, 60th Rd. $1,007, 132nd St. $1,232; from DiSalvo Contg. Co., 148th St., $14,848, June St. $48,157; from Gregory Contg. Co., 3515 East 124th St., New York, 80th St. $7,029; from Peace Bros., 57 North Lawrence St., Flushing, Leverich St., $4,078; from J. Scocozza, Prince St. $3,290, 146th St. $2,263, 100th Ave $721, Sutter Ave. $4,654; from A. M. Hazell Inc., 27 Courtlandt St., New York, Ft. College Pl., $15,828, from Mannino & Pittari, Springfield Blvd., $3,293; from C. Petracca, 737 Kathleen Court, Brooklyn, Jamaica Ave., $124,571; from J. Gallo, Parson Blvd. $36,308, pumping station at Gardner St., $39,507. Noted July 11.

Contracts Awarded

Ga., Rockmart—L. O. Halsey, supt. Water & Light Dpt., City Hall, 22,700 lin.ft. 8- to 12-in. concrete sewers, to P. N. Howard, Greensboro, N. C., $17,461. Noted June 6.

Ill., Evanston—See "Streets and Roads."

Ill., Peoria — Bd. Trustees Greater Peoria Sanitary Sewage Disposal Dist., Div. F, South Section Intercepting Sewer, to Willardson Constr. Co., Springfield. Noted May 30.

Ill., Westchester—Bd. Local Impvts., storm and sanitary sewers, to Allied Contractors, 6 South Michigan Ave., Chicago, $205,114. Noted June 27.

Md., Baltimore—Mayor and City Council, sanitary sewers and storm drains, Contr. 262, to Tana Constr. Co., 216 South Bond St., $41,211.

Md., Baltimore—Bd. Awards, sewers, storm drains in Storm Water Contrs. 133 and 134, to N. Martell, 4400 Vesta Ave., $22,265 and $34,934 respectively. Noted July 4.

Md., Baltimore — Mains in Tioga Parkway, Hillsdale Park, and McComas St., to Ligon & Ligon 3310 Ridgewood Ave., $41,377.

Md., Towson—Baltimore Co., vitr. sewer in Overlea, Contr. 16-S, to F. Angelozzi, 123 South High St., Baltimore, $49,092. Noted June 27.

Mich., Detroit—Dpt. P. Wks., Lateral Sewer 5301, in blocks bounded by Parkway, Parkland, Tireman and Joy Rd., to Waterway Constr. Co., Sherwood and Rindke Rd., $55,559.

Mass., Waltham—Dpt. Mental Diseases, 11,460 ft. 6- to 15-in. vitr. and c.i. sewerage system at Metropolitan Hospital, to Federico & Susi Co., 43 Westwood St., Dorchester. Est. exceeds $25,000. Noted June 20.

Miss., Houston—Sewerage system, to Dobson & Humphreys, Omaha, Neb., $55,000.

Mo., Fredericktown—City Clerk, 11,507 ft. 8- to 15-in. vitr. clay sewers, 43 non-auto flush tanks, disposal plant, to J. O'Neil, Leavenworth, Kan., $81,840. Est. $100,000. Noted June 27.

N. J., Bergenfield — Bd. Boro Council, Boro Hall, sewers and sewerage lift station, to Burns & Hall, Park Ave., Dumont, $119,313. Noted June 13.

N. J., Union—Township Comn., storm sewer in Chestnut St., to J. Abbott, Inc., 19 Claremont Ave., Montclair, $14,633. Noted May 16.

N. Y., Larchmont—Village Trustees, at office E. D. Wakeman, clk., sewerage system, to Malloy Bros., Larchmont. Noted May 9.

N. Y., New York—J. Miller, pres. Manhattan Boro, Municipal Bldg., sewer in East 57th St., to Melrose Constr. Co., 230 East 162nd St., $15,716. Noted June 27.

N. Y., New York—H. Bruckner, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., sewers in Agar Pl., to L. Libutti, 3218 Cambridge Ave., $37,136; Matthews Ave., to F. Gabrielle, 2750 Creston Ave., $7,310; Eastern Blvd., to Anita Constr. Co., 410 200th St., $13,049. Grand total $123,285. Noted July 4.

O., Brooklyn (br. Cleveland)—Village, storm, sanitary sewers in 12 streets, to Kassouf & Co., 3182 West 25th St., Cleveland. $91,000.

O., Canton—Stark Co., 5.5 mi. lateral sewers in Edgefield Dist., to Nickles Bros., 1533 Tuscarawas St. E., $52,119. Est. $50,000.

O., Cuyahoga Falls—J. G. Murray, dir. P. Serv., 2½ mi. sanitary, storm sewers, to F. George, 1657 Mahoning Ave., Youngstown, $226,500. Est. $250,000. Noted July 11.

O., Pepper Pike (br. Cleveland)—Sewers in Gates Mills Blvd., Sects. 1 and 2, to Iafornaro-Galitta Co., Citizens Bldg., Cleveland, $42,630 and $38,789 respectively; Sect. 3, to J. B. Lynn Constr. Co., 16311 Saranec Rd., Cleveland, $24,984; Sect. 4, to Haddad-Mall Co., Hanna Bldg., Cleveland, $26,692. Grand total $133,095.

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The Invisible Superintendent at the Mortar Box *Produces a Mortar* WITHOUT *Disadvantages*

THE nearest possible approach to a perfect mortar is one that combines the plasticity of lime with the strength of portland cement, *without any of their disadvantages.*

Mortar made of one part BRIXMENT, three parts sand, has both plasticity and strength. It is easy to spread *and sticks to the brick.* It becomes so hard that a nail cannot be driven into the joint; its ultimate strength exceeds that of the brick itself.

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BRIXMENT

for Mortar and Stucco

Sewers (Continued)

Ont., Sandwich—Town, 8 in. and up vitr. tile sewers, to De Santi & Dominato, 501 Mercer St., Windsor. Est. $30,000.

WASTE DISPOSAL

Proposed Work

Tex., San Antonio—City, 12 hole garbage incinerator. $115,000. I. Ewig, city engr.

Ont., Hamilton—City, concrete, brick, steel incinerator with equipment. $30,000. W. L. McFaul, City Hall, engr.

Bids Asked

Miss., Greenwood—Aug. 6, by Mayor and City Council, refuse incinerator. B. Duggan, city clk.; adv. E. N.-R. July 25.

BRIDGES

Proposed Work

California—City of Long Beach trestle bridge over Alamitos Bay entrance between Seal Beach and Long Beach. $130,000. A. H. Adams, Long Beach, city engr.

Calif., Eureka — Humbolt Co. bridge over south fork Eel River, on Redway—Briceland Rd. $40,000. F. Kelley, Eureka, co. surv.

Calif., Long Beach—City viaduct, Hill St. and Orange Ave. $150,000. Cities of Long Beach and Signal Hill and Pacific Electric Ry. Co., Los Angeles, will share cost.

Calif., Wheatland — Yuba Co. (Marysville) and Sutter Co. (Yuba City) preliminary plans bridge across Rio Oso, near here. $60,000. W. Shearer, Yuba City, and J. Meek, Marysville, engrs.

Conn., Hartford—Concrete, steel bridge over Connecticut River. To exceed $25,000. R. N. Clark, City Hall, engr.

Ia., Dubuque—City, c/o C. F. Bartels, building comr., preliminary plans rein.-con. viaduct across 4th and 6th Sts.

Mass., Millbury—Town, O. Harris, chn. Bd. Selectmen, 2 concrete, steel bridges, $25,000 or more. J. M. Gallagger, 25 Brattle St., Worcester, archt.

N. J., Barnegat—Private Enterprise, 2 leaf bascule bridge, 3,200 ft. long over Barnegat Inlet. $500,000. W. Collison, Ocean City, engr.

O., Canton—City and Stark Co. preliminary plans concrete bridge. $25,000-$40,000. W. E. Sarver, city engr. A. M. Wise, co. engr.

Okla., Mervine—Kay Co. preliminary plans 6 span 100 ft. rein.-con. bridge over Beaver Creek. $25,000. J. S. Clark, Newkirk, co. engr.

Pa., Pittsburgh—Allegheny Co., bridge over Ohio River between Reedsdale St. N. S. and West Carson St. W. E. $3,540,000.

R. I., Providence—Bd. Contr. & Supply, City Hall, revised plans steel, concrete bridge, Crawford St. To exceed $25,000. Former bids rejected. S. F. Nolan, City Hall, engr. Noted Apr. 4.

Tex., San Antonio—City, surveys, concrete, steel vehicular and pedestrian bridge over San Antonio River, Travis St. $35,000. Hawley & Freese, Frost Bldg., engrs.

Ontario—York Co. (Toronto) concrete, rein.-con. bridge on Markham-Scarboro town line. Est. $25,000-$30,000. F. Barber, 45 Jarvis St., Toronto, engr.

Que., Cap Rouge—Provincial Dpt. P. Wks., Montreal, bridge. $75,000.

Bids Asked

Calif., Los Angeles—Pacific Electric Ry. Co., E. C. Johnson, ch. engr., Pacific Electric Bldg., taking bids 2 concrete, steel bridges, one 201 ft. over Los Angeles River, other 180 ft. over Tujunga Wash. $100,000. Structural steel contract awarded to Virginia Bridge & Iron Co., Metropolitan Theater Bldg. Noted June 6.

Calif., Meyers—July 31, by State Hy. Comn., Sacramento, two 21 ft. span rein.-con. girder bridge over Tallac Creek, 8 mi. north of El Dorado Co. C. H. Whitmore, dist. engr. State Hy. Comn., 502 State Office Bldg., Sacramento.

D. C., Wash. — Aug. 7, by District Comrs., District Bldg., reconstructing floor system, hand rail of Anacostia River Bridge; adv. E. N.-R. July 25.

Kentucky — July 31, by State Hy. Dpt., Frankfort, 50 ft. concrete deck girder span bridge over Louisville & Nashville R.R., near Drakesboro on Central City-Drakesboro Rd., S. P. 15-AB, Muhlenberg Co. J. S. Watkins, hy. engr.

Mass., Boston—Aug. 20, by Dpt. P. Wks., steel, concrete draw bridge, Congress St. $800,000. J. J. Carty, Bridge and Ferry Div., and Straus Bascule Bridge Co., 225 North Michigan Ave., Chicago, Ill., engrs. Noted Apr. 25.

Mo., Clayton—See "Streets and Roads."

New Jersey—July 26, by Bd. Freeholders Morris Co., Court House, Morristown, and Union Co., Court House, Elizabeth, 2 span 88 ft. steel, concrete bridge, 50 ft. over Passaic River, Stanley Ave., between Chatham and Summit, $40,000. L. J. Bauer, Court House, Elizabeth, engr, former, and W. Hopkins, Court House, engr, latter countries.

New Jersey—Aug. 12, by State Hy. Comn. Trenton, viaduct on Route 25 (Route 1 extension), Sects. 18 and 19, Contr. 26; 2 bridges on Route 39, Sect. 7, Burlington Co. A. L. Grover, ch. clk.; adv. E. N.-R. July 25.

N. J., Dunnellen—Aug. 2, by Bd. Freeholders Somerset Co., Court House, Somerville, concrete, steel bridge over Green Brook near here, Somerset and Middlesex Counties. $25,000. O. Smith, Somerville, co. engr.

New York—Aug. 6, by Westchester Co. Park Comn., 72 West Pondfield Rd., Bronxville, 2 stone faced rein.-con. bridges, Sheridan Ave., Mt. Vernon, and on New Rochelle Rd., Eastchester, Contr. 238, L. G. Holleran, acting ch. engr.; adv. E. N.-R. July 25.

N. Y., Buffalo—July 30, by Supervs. Erie Co., 29 County Hall, 40 ft. I-beam bridge over Smokes Creek, Town Line Rd., Town of Hamburg and City of Lackawanna. G. Diehl, Ellicott Square, engr.

N. Y., Rochester — Aug. 14, by Purchasing Agent Dpt. P. Wks., City Hall, removing present Smith Street Bridge, and constructing new steel deck bridge; adv. E. N.-R. July 25. Noted Jan. 24.

Ore., Portland—Aug. 19, by Comrs. Multnomah Co., St. Johns Bridge. Robinson & Steinman, 622 Yeon Bldg., consult. engrs.; adv. E. N.-R. July 25. Noted May 2.

Pennsylvania—See "Streets and Roads."

Texas—July 31, by G. Gilchrist, state hy. engr., Austin, bridges on Hy. 73A, Austin Co. $65,000. H. Schroeter, Belleville, resident engr.

Texas—Aug. 1, by G. Gilchrist, state hy. engr., Austin, bridges on Hy. 112, Karnes Co., $32,000—Hy. 5, Grayson Co., $30,000—Hy. 6, Ellis and Dallas Counties, $55,000—Hy. 2, Tarrant Co., $63,000—Hy. 3, Harris Co., $35,000.

B. C., Vancouver—Aug. 6, by P. Philip, engr. Dpt. P. Wks., Victoria, superstructure for 200 truss span bridge over Capilano River, West Vancouver. $50,000.

Ont., Toronto—July 30, by Toronto Harbour Comrs., Harbor Bldg., superstructure steel bascule lift bridge over ship channel at foot of Cherry St. Substructure, to Foundation & Constr. Co., Temple Bldg.

Bids Received

California—State Hy. Comn., Sacramento, July 10, rein.-con. girder bridge across Arcade Creek, 11 mi. east of Sacramento, Sacramento Co., from G. J. Ulrich Constr. Co., Modesto, Calif., $13,132; three 25 ft. span concrete girder bridge across Graves Creek, 2 mi. south of Templeton, San Luis Obispo Co., from W. Lane, Paso Robles, Calif., $10,978. Noted June 27.

Mass., Boston—Dpt. P. Wks., concrete, steel bridge over Midland Div. New York, New Haven & Hartford R.R., on River St., from J. McCourt Co., 910 Huntington Ave., $101,226. Noted June 27.

Michigan—C. F. Cowgill, resident engr., Plymouth, July 2, steel deck girder bridge Project FB1 of 63-20-3C-2, Oakland Co., from R. B. Jackson Constr. Co., Jackson, for State Hy. Dpt., Lansing. $29,365.

New Jersey—State Hy. Comn., Trenton, July 15, bridge on Route 48, Sect. 21, Gloucester Co., from H. Derberger Constr. Co., Bethlehem, Pa., $49,129. Noted July 4.

N. Y., Buffalo—Bd. Supervs. Erie Co., Court House, July 9, steel plate girder bridges, Amherst, from J. J. Miller & Son, Tonawanda, $16,800 on Sardinia-Schutte Corners Rd., Sardinia, from Stapell Mumm & Beals, Camp Rd. and Erie R.R., Hamburg, $53,700. Noted July 4.

Contracts Awarded

California—Santa Clara Co. (San Jose) and San Mateo Co. (Redwood City) bridge over San Francisquito Creek, to Collins and Martin, San Jose, $27,325.

Calif., Napa — J. A. Daly, clk. Napa Co., macadam paving roads, to H. Smith, St. Helena, $25,170. Noted June 20.

Calif., San Mateo—Grading, curbing, walks, guttering, 5-6-7-8 in. concrete paving Poplar Ave. and Humboldt St., to Heafey-Moore Co., 344 High St., Oakland, $69,410.

Calif., San Rafael—R. E. Graham, clk. Marin Co., bridge over Arroyo San Geronimo, at Point Reyes Station, to A. Mattson, San Bruno, $24,055. Noted July 4.

Calif., Santa Cruz—City, Cut-Bias Bridge, 332 ft. long, 36 ft. roadway over San Lorenzo River, on Riverside Ave. and 3rd St. $55,000. R. Fowler, city engr.

Colo., Canon City—L. G. Piper, Canon City, and San Antonio, Tex., steel cables and steel for 2,500 ft. cable suspension bridge over Arkansas River, at Royal George about 8 mi. west of here, to Colorado Fuel & Iron Co., Pueblo, $250,000. Noted May 16.

Ga., Lyons—Toombs Co., concrete paving 5.7 mi. hy. from Tom Coursey Pl. on Route U. S. No. 1 to Vidalia, 18 ft., to Whitley Constr. Co., La Grange, $90,000. Noted Apr. 25.

Iowa—State Hy. Comn., Ames, bridges, culverts in Crawford Co., to Olson Constr. Co., Waterloo, $26,500—Harrison Co., to Jansen Constr. Co., Kimballton, $2,835—Harrison Co., to C. R. Yegge, Boone, $12,282—Jackson Co., to P. Jayne, 2201 Mt. Vernon Ave., Cedar Rapids, $18,160—Page Co., to Ward Constr. Co., Decorah, $2,080—Tama Co., to H. O. Graham, Cedar Rapids, $6,740—Union Co., to F. O. Akin, Corning, $8,625. Grand total $77,300. Noted July 4.

Ia., Atlantic—Cass Co., 4 high truss bridges to St. Joseph Structural Steel Co., St. Joseph, Mo., $24,300. Noted June 27.

Ia., Des Moines—Polk Co., 4 pony truss bridges, to Iowa Bridge Co., Eastern Blvd., $33,985.

Kansas—State Hy. Comn., Wamego, bridges in Osage Co., to R. K. Walters, Marion, $31,714—Pottawatomie Co., to McFarland Constr. Co., McFarland, $7,856, and to Cook & Ransom, Ottawa, $26,961. Grand total $66,531. Noted June 20 and 27 under "Streets and Roads."

Kansas—State Hy. Dept., Manhattan, bridges in Pottawatomie Co., to G. W. Condon, 415 Farnum St., Omaha, Neb., $43,157.

Kan., Westmoreland—State Hy. Comn., at Manhattan, 32 span timber trestle, Pottawattamie Co., to G. W. Condon, 415 Farnum St., Omaha, Neb., $26,068.

Maryland — State Roads Comn., Baltimore, double span steel, concrete girder bridge, Contr. C1-73, Carroll Co., to De Luea Constr. Co., Dundalk, $23,318. Noted July 11.

Md., Annapolis—Comrs. Anne Arundel Co., Glenburnie, 260 lin. ft. creosoted timber pile, rein.-con. deck bridge with 96 ft. swing drawn span, and dismantling present wood bridge over Weems Creek, Dist. 2, West Annapolis, to Mullan Constr. Co., 3945 Greenmount Ave., Baltimore, $30,467.

Mo., Clayton—See "Streets and Roads."

New York—A. W. Brandt, comr. Hys., Albany, bridges in Monroe Co., to Standard Eng. & Contg. Co., 36 Pearl St., Albany, $17,922 est. $20,458—Monroe Co., to J. W. Murray, Cutler Bldg., Rochester, $29,741 est. $42,963—Nassau Co., to United Road Constr. Co., Astoria, $146,275 est. $188,632—Tompkins Co., to M. E. Cole, Inc., LeRoy, $112,410 est. $129,600. Grand total $365,521. Noted June 13 under "Streets and Roads."

Ohio—R. N. Waid, dir. Hys., Columbus, concrete beam bridge, incl. approaches over Tuscarawas River, Sect. A, Canal Dover-New Philadelphia Rd., to Philip Deffenbacher Co., Massillon, $25,406.

O., Cleveland—New York, Chicago & St. Louis R.R. Co., Terminal Tower Bldg., A. C. Harvey, ch. engr., concrete deck for bridge on East 55th St., and rein.-con. bridge on East 89th St. and Nickel Plate R.R., to Lowenschn Constr. Co., 1740 East 12th St. Est. $100,000 and $150,000 respectively.

O., Warren—Trumbull Co., 340 ft. rein.-con. bridge over Mahoning River on West Market St., to Porterfield-Binger Constr. Co., Youngstown, $178,060. Est. $230,000. Noted July 4.

Ore., Portland — Constructing 33rd Street Bridge over Oregon-Washington R.R. & Navigation Co. tracks, to Sandstrom & Fiegenson, Portland, $66,378.

Pa., Bridgeville—Comrs. Allegheny Co., Court House, Pittsburgh, Chartiers Creek Bridge, near here, to Union Eng. & Constr. Co., Fitzimmons Bldg., Pittsburgh, $84,871. Noted June 27.

Vermont—Bd. Selectmen, Fairfield, rein.-con. bridge between Fairfield and East Fairfield, to G. F. Badger & Co., Bristol. Est. $25,000. Noted June 27.

Virginia—State Hy. Comn., Richmond, bridges over New River and Carters Creek, to Bowers & Bennett, Whiteville, N. C., $89,215 and $30,065 respectively—over Pound River, to K. W. and H. T. Lawrence, Salem, $18,253—over Tuckahoe Creek, to P. L. Baird, Roanoke, $8,600 — guard rail, to Marye & Blankership, Shawsville, $5,104—improving Project F417A, Rappahannock-Caret, to Sanderson, Son & Parker, Cartersville, $38,707—Project S464F, Tazewell Co., to Lipscomb-Lambert, Bluefield, W. Va., $19,218. Grand total $209,162. Noted June 20 under "Streets and Roads."

B. C., Vancouver—P. Philip, engr., Dpt. P. Wks., Victoria, substructure, 200 ft. steel truss span bridge over Capilano River, West Vancouver, to Ellis-Cotton Ltd., False Creek Yards, for Provincial Govt., Victoria. $46,296.

Ontario—C. H. Fullerton, deputy minister Dpt. Northern Development, Parliament Bldgs., Toronto, bridges, Contr. 29-93, to Johnson Bros., 43 Market St., Brantford—Contr. 29-94, to James Vance, Woodstock—Contr. 29-95, to A. Cavotte, 45 Jarvis St., Toronto—Contr. 29-96, to T. H. Hemming, 53 Endean St., Toronto, Contr. 29-97, to Holdcroft Constr. Co., Kingston. Total est. $150,000. Noted May 16.

Ont., Toronto—See "Bids Asked."

Ont., Toronto—See "Waterworks."

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STREETS AND ROADS

Bids Asked

Ala., Birmingham—Aug. 6, by City Comn., concrete curbing, guttering, 4 ft. sidewalks, 2 in. asphalt on 5 in. concrete paving 2 blocks 36th Ave. N., 39th Pl. N., and 1 block 80th St. N., $9,700 and $4,250 respectively—reconstructing sidewalks of 6 in. concrete 1 block 10th Ave. S., $425—6 in. concrete paving 1 block 14th Alley S., $1,165—8 in. concrete paving 2 blocks 20th St. N., $12,050. A. J. Hawkins, city engr.

Ala., Birmingham—Aug. 20, by City Comn., 7 in. concrete paving 3 blocks Sparta Ave., $13,600—4 blocks Avenue I, Ensley, $18,150—curbing, guttering, sidewalks, 7 in. concrete paving 1 block 4th Ave. S., $6,900—sidewalks, curbing, guttering, 2 in. asphalt paving 3 blocks 1st Ave. N., $15,600, all 30 ft. A. J. Hawkins, city engr.

California—July 31, by C. H. Purcell, engr. State Hy. Comn., Sacramento, grading, widening with oil treated crushed rock borders 5.3 mi. road between Napa and Greenwood Corner, Napa Co.—grading, asphaltic concrete paving 12.2 mi. road between Southerly Boundary and Pixley, Tulare Co.—grading 2.6 mi. road between La Canada and Point 2.5 mi. northerly, Los Angeles Co.

California—Aug. 14, by State Hy. Comn., Sacramento, bituminous macadam paving 3.8 mi. road between Elk Valley and Smith River, Del Norte Co.—14.9 mi. road between point 1 mi. south of Orick and north boundary, Humboldt Co.—10.6 mi. road between Mill Creek and Trinidad, Humboldt Co. C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

Calif., Woodland—Aug. 5, by Bd. Supervs, Yolo Co., grading, paving 4.4 mi. road connecting Clarksburg with Freeport bridge. $50,000. A. G. Proctor, Woodland, co. engr. Noted Feb. 14.

Delaware — Aug. 13, by State Hy. Dpt., Dover, grading, concrete paving 3.96 mi. Levels Rd., Contr. 119; grading, crushed stone or crushed slag surfacing 2.2 mi. road from Farmington to Andrewsville, Contr. 135; adv. E. N.-R. July 25.

Ga., Baxley—July 29, by R. M. Dunn, chn. Appling Co. Comn., grading, bridging 10.5 mi. state hy. between Baxley and Hazlehurst. Address Engineer Appling Co., Court House, engr.

Ill., Deerfield—Aug. 5, by Village, concrete paving Goldman Ave., $48,000. Consoeur, Older & Quinlan, 222 North Wells St., Chicago, engrs.

Ill., Ellsworth—Aug. 7, by O. F. Sutton, hy. comr., Town Hall, grading, graveling 30,000 cu. yd. Dawson Twp. Rds. $30,000.

Ill., Mt. Prospect—July 30, by Village, paving Candota Ave., $57,000. Consoer, Older & Quinlan, 222 North Wells St., Chicago, engrs.

Ill., Peoria—July 29, by Bd. Local Impvts., City Hall, J. M. Barton, pres., grading, curbing, rein.-con. paving 4 blocks Evans St., $19,576; 4 blocks Norton St., $19,769, both 30 ft. H. A. Hunt, City Hall, engr.

Ill., Sabina—Aug. 2, by West Twp., T. Taylor, Arrowsmith, hy. comr., furnishing, hauling, distributing 50,000 cu.yd. gravel on West Twp. Rds. $50,000.

Ind., Decatur—Aug. 6, by Bd. Comrs, Adams Co., macadamizing, Daniel Rinehart Rd., French Twp.—Wm. Yager Rd., Kirkland Twp.—Charles Ahr Rd., St. Marys Twp. $35,000. A. Harlow, co. aud.

Ind., Princeton—Aug. 6, by Bd. Comrs, Gibson Co., constructing Isaac N. Epperson et al. Rd., Union Twp. $17,275—Doyle Hartley et al. Rd., Patoka Twp., $10,130—Henry Armstrong et al. Rd., Montgomery Twp., $8,870. S. G. Marshall, co. aud.

Ind., South Bend—Aug. 5, by Bd. Comrs. St. Joseph Co., constructing Liberty Hy. $93,600. F. P. Crowe, co. aud.

Ia., Ainsworth—Aug. 1, by P. E. O'Connor, town clk., grading, curbing, 7 in. rein.-con. paving 6,190 sq.yd. Howard R. Green Co., 208-10 Beaver Bldg., Cedar Rapids, engrs.

Ia., Davenport—Aug. 5, by F. A. Haas, city clk., sheet asphalt, brick or 8 in. rein.-con. paving 4,765 sq.yd. 30th St., and 4 alleys. Plans 8 in. rein.-con. paving Cedar St., $7,457. 2½ in. brick or sheet asphalt paving Kirkwood Blvd., $29,753 or $36,166. 6 in. concrete paving 1 alley, $1,815. Contract for 2½ in. brick paving Locust St., to McCarthy Impvt. Co., 801 Kahl Bldg., $16,874. L. E. Sneary, City Hall, engr.

Ia., Des Moines—July 29, at office Auditor Polk Co., grading 1.5 mi. Spring Creek Rd. and 2 mi. Ivy Rd. F. O. Laing, Des Moines, co. engr.

Ia., Ida Grove—July 30, at office Auditor Ida Co., graveling 9.5 mi. Ida Grove-Galva Rd. and 9 mi. Battle Creek-Cushing Rd. G. S. Witters, Ida Grove, co. engr.

Ia., New Bedford—Aug. 2, by W. J. Harmon, town clk., grading, curbing, 7 in. rein.-con. paving 8,100 sq.yd. Howard R. Green Co., 208-10 Bever Bldg., Cedar Rapids, engrs.

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Ia., Newton — July 30, at office Auditor Jasper Co., graveling 5 mi. Kellogg-Laurel Rd.—grading 3 mi. Melbourne Rd.—1.36 mi. Lynnville-Taintor Rd. R. McMurray, Newton, co. engr.

Kan., Kansas City—Aug. 5, by Clerk Wyandotte Co., gravel or bituminous macadam paving 0.75 mi. road, 18 ft. O. K. Williams, Kansas City, co. engr.

Kentucky—Aug. 9, by State Hy. Dpt., Frankfort, surfacing 10.2 mi. Jackson-Hazard Rd., F. A. 138-BC-S and 11.3 mi. same road, Sect. D-S, Breathitt Co.—8.7 mi. Prestonsburg-Pikeville Rd., S. P. 6-D-S and 10.9 mi. same road F. A. 132-A-S, Floyd Co.—9.8 mi. Clinton-Mayfield Rd., S. P. 7-D-S, Hickman Co—11.3 mi. Salyersville-West Liberty Rd., F. A. 120-AD-S, Magoffin Co.—10.9 mi. Salyersville-West Liberty Rd., F. A. 120-BC-S, Morgan Co.—9.3 mi. Hazard-Jackson Rd., F. A. 138-E-S, Perry Co.—11 mi. Campton-Jackson Rd., F. A. 121-A-S, Wolfe Co.—bituminous tread treatment 8.38 mi. Carrolton-New Castle Rd., S. P. 46-A, Carroll Co.—10 mi. Beardstown-Hodgenville Rd., S. P. 3-D-1, Nelson Co.—10012 mi. Hodgenville-Glasgow Rd., S. P. 3-H-1 and 9.811 mi. same road, S. P. 3-G-1, Hart Co. J. S. Watkins, hy. engr.

La., Benton—Aug. 6, by Police Jury Bossier Parish, graveling Plain Dealing-Carterville Hy.

La., Coffeeville—Aug. 5, by Commissioner Road Dist. 4, Yalobush Parish, graveling 5.2 mi. Coffeeville-Oakland Hy.

La., Monroe—July 31, by W. Meel, clk., grading, sheet asphalt on concrete paving 21,050 sq.yd. Erin, North 2nd, Rochelle, Glenmar, South 2nd and Bres Sts. $50,000.

La., Oak Grove—Aug. 5, by Police Jury West Carroll Co., graveling 4.18 mi. Rd. Dist. 7.

La., St. Joseph—Aug. 14, by Police Jury, Tensas Parish, graveling 7.25 mi. Newells-Ridge Hy.—11.3 mi. Newellton-Newlight Hy.—5.3 mi. Someset-West Hy.

Maryland—July 30, by State Rd. Comn, Baltimore, concrete paving 1 mi Contr. S-36, Somerset Co.—1 mi. Contr. S-34, Somerset Co. —0.2 mi. Contr. M-128, Montgomery Co.—5 mi. Contr. K-42, Kent Co.—1 mi. Contr. H-74, Harford Co.—concrete shoulders 1 mi. Contr. B-118, Baltimore Co. H. Williar, Federal Reserve Bank Bldg., engr.; adv. E. N.-R. July 25.

Md., Baltimore—July 30, by Bd. Awards, concrete paving 12,100 sq.yd. Contr. 530, Baltimore Co. N. L. Smith, Municipal Office Bldg., hys. engr.

Massachusetts—July 30, by Dpt. P. Wks., Boston, gravel and bituminous macadam paving 24,350 ft. hy. Townsend and Amesbury — bituminous macadam paving 22,004 ft. Bedford, Beverly, Greenfield, Westboro and Sutton. A. W. Dean, Dpt. P. Wks., engr.

Mass., Boston—July 31, by Dpt. P. Wks., sheet asphalt or bitulithic paving Dent St., Ward 20. $25,000. J. H. Sullivan, comr.

Mass., Boston—Aug. 1, by Dpt. P. Wks., sheet asphalt or bitulithic paving Glenway St., Ward 14. $25,000 or more. J. H. Sullivan, comr.

Miss., Fayette—Aug. 6, by Bd. Supervs. Jefferson Co., improving roads in Dist. 1, 58,000 cu.yd. excav., 10,480 cu.yd. gravel 1 mi. haul, 20,000 units overhaul, 1,072 ft. 12- and 34-in. pipe.

Miss., Hernando—Aug. 5, by Bd. Supervs. De Soto Co., grading 5 mi. Projects 1 to 4 (inclusive).

Miss., Vicksburg—Aug. 5, by Hy. Comn. Warren Co., 606 1st Natl. Bank Bldg., grading, graveling, 3.4 mi. Jeff Davis Academy-Fishers Ferry Rd., Project 6-6, Dist. 3; 3.9 mi. Morley Fork Rd., Project 26-R, Dist. 5. B. F. Nichols, Vicksburg, engr.

Miss., Water Valley—Aug. 5, by Commissioners Road Dist. 4, Yolabusha Co., graveling 4 mi. Water Valley-Oakland Hy.

Mo., Clayton — July 31, by St. Louis Co. Court, W. E. Miller, clk., Court House, grading, rein.-con. paving 6,980 ft. North and South Rd.; also 45 ft. steel bridge over Cold Water Creek, on Robbins Mills Rd. R. Jablonsky, Court House, engr.

Mo., Kansas City—July 30, by Clerk Jackson Co., asphaltic concrete paving 12 mi. Blue Ridge Blvd., 18 ft.—concrete paving 10 mi. Blue Springs Rd. between Tarnsey Rd. and Hy. 24, 20 ft. Stayton & Veatch, 508 Interstate Bldg., engrs.

Mo., St. Louis—Aug. 13, by Bd. P. Serv., City Hall, warrenite bitulithic paving 5,800 sq. yd. Kingshighway Northwest, $44,680—rein.-con. paving 4,300 sq.yd. Robert Ave., $6,600—3,950 sq.yd. Grand Ave., $29,240—asphaltic concrete paving 5,300 sq.yd. Hartford St., $22,680—1,510 sq.yd. Hurst Court, $10,720—1,540 sq.yd. Trainoe Court, $10,600—830 sq.yd. Maury Ave., $7,360—2,975 sq.yd. Nagel Ave., $19,400—1,340 sq.yd. Keokuk St. $8,560—amiesite paving 5,670 sq.yd. Macklind St., $39,760. W. W. Horner, city engr.

New Jersey—Aug. 12, by State Hy. Comn., Trenton, grading, 9 in. rein.-con. paving 4,308 mi. Route 29, Sect. 4, Union and Somerset Counties; 6.2 mi. Route 39, Sect. 8, Atlantic and Burlington Counties. A. L. Grover, ch. clk.; adv. E. N.-R. July 25.

N. J., Freehold—Aug. 7, by Bd. Freeholders Monmouth Co., Court House, rein.-con. repaving 2.04 mi. Farmingdale-Belmar Rd. 32, Sect. 2. G. K. Allen, Jr., 60 Broad St., Red Bank, co. engr.; adv. E. N.-R. July 25.

N. J., Freehold—Aug. 7, by Bd. Freeholders Monmouth Co., paving 2 mi. Belmar-Glendola Farmingdale Rd. G. K. Allen, 60 Broad St. Red Bank, engr. Noted Apr. 4.

N. J., Hoboken—July 30, by Bd. City Comrs. City Hall, grading, sheet asphalt paving 7th St., from Jefferson to Madison Sts. $25,000. J. Wittemore, city engr.

N. J., Newark—July 30, by Bd. City Comrs. City Hall, curbing, sheet asphalt on 6 in. concrete paving Wickliffe St., $25,689; Varsity Pl. West End Ave. and Foundry St., $25,411. J. Costello, city engr. Noted June 20.

N. J., New Brunswick—July 30, by Bd. City Comrs., City Hall, rein.-con. paving new street, $25,000. A. Atkinson, city engr.

N. J., Piscataway town — July 26, by Bd. Town Comrs., Town Hall, rein.-con. paving 2,025 ft., Old Post Rd., Raritan Twp. $25,000. R. P. Wilson, 46 Paterson St., New Brunswick twp. engr.

N. J., Rahway—July 30, by Bd. Freeholders Union Co., Court House, Elizabeth, curbing, sheet asphalt on 6 in. concrete and old brick or 8 in. concrete paving 14,370 sq.yd. Hazlewood Ave. $25,000. J. L. Bauer, Court House, Elizabeth, co. engr.

N. J., Trenton—Aug. 2, by City Comn., paving Ohio, Turpin and Oak Sts. J. E. English, city engr.

New York—Aug. 8, by A. W. Brandt, comr. Hys., Albany, constructing roads in Albany, Lewis-St. Lawrence, Montgomery, Onondaga and Orange Counties; reconstructing hys., bridges in Chautauqua, Cattaraugus, Erie, Lewis, Madison, Monroe, St. Lawrence, Schoharie, Tompkins and Westchester Counties; adv. E. N.-R. July 25.

N. Y., Buffalo—Aug. 5, by G. Fisk, comr. Dpt. P. Wks., Municipal Bldg., repaving Fillmore Ave. between William St. and Bway.; also between Bway. and Genessee St. (except tract area). C. E. P. Babcock, engr.

N. Y., Greenburgh—Aug. 7, by Westchester Co. Park Comn., 72 West Pondfield Rd., Bronxville, grading 0.49 mi. Central Westchester Parkway, Contr. 275. L. G. Holleran, acting ch. engr.; adv. E. N.-R. July 25.

N. Y., New York—July 31, by J. Miller, pres. Manhattan Boro. Municipal Bldg., widening granite block on concrete repaving Broome, 38th, West 14th Sts.

N. Y., St. George—July 31, by J. A. Lynch, pres. Richmond Boro. Boro Hall, grading, concrete paving Page Ave.; concrete curbing, steel guard rail, vitr. brick guttering 800 sq.yd. Oder Ave., Whitaker Pl.

O., Akron—July 31, by Comrs, Summit Co., grading, bituminous macadam paving 32,000 sq. yd. Fairlawn Heights Allotment Sect. E, $120,000. H. G. Sours, Court House, engr.

O., Columbus—July 30, by W. H. Duffy, dir. Service, grading, curbing, sewers, paving 21,830 sq.yd. Cassingham, Castlegate, Dover and Brookwood Rds., Roosevelt Ave., and Berwick Blvd., brick $108,112, asphalt $153,163.

O., Euclid (br. Cleveland)—Aug. 5, by Village, paving Volker, Blackstone and Tracy Aves. $25,000 or more. F. A. Thomas, Town Hall, engr.

Oklahoma—July 29, by State Hy. Dpt., Oklahoma City, concrete or sheet asphalt paving 48,600 sq.yd. U. S. Hy. 66, F. A. P. 136, near Davenport, $105,000—52,000 sq.yd. near Stroud, $110,000—52,000 sq.yd. near Chandler, $110,000, all Lincoln Co.—concrete paving 52,000 sq.yd. U. S. Hy. 25, F. A. P. 192, Washington Co., $100,000, all 18 ft. wide. J. Rightmire, acting hy. engr.

Oklahoma—July 29, by State Hy. Dept., Oklahoma City, concrete paving 8 mi. State Hy. 1, F.A.P. 198-B-C-11, 15.5588 mi. State Hy. 33, F.A.P. 199-A2-J2-H2 2 mi. State Hy. 1, F.A.P. 231-E-2, all Payne Co. J. F. Rightmire, acting hy. engr.

Okla., Seminole—Aug. 6, by P. Noe, city clk., grading, paving 16 blocks 7th, College, Timmons and Harber Sts., 26 and 30 ft. $66,870. Long & Co., 1300 Colcord Bldg., Oklahoma City, engrs.

Pennsylvania—Aug. 1 and 2, by State Hy. Comn., Harrisburg, grading, rein.-con., vitr. brick paving 80 mi. 21 projects in Armstrong, Berks, Cambria, Chester, Dauphin, Huntingdon, Indiana, Lackawanna, Lancaster, Lycoming, McKean, Montgomery, Potter, Washington Counties; also bridges in Wayne, Cameron, Greene, McKean, Tioga Counties. J. L. Stuart, secy.; adv. E. N.-R. July 25.

Pa., Phila.—July 30, by Dpt. P Wks., Bureau Hys., A. Murdock, dir., City Hall Annex, asphalt, redressed granite block repaving.

South Carolina—July 30, by Hy. Dpt., Columbia (S.P. means State Project and F.A.P. Federal Aid Project), grading, concrete paving 7.99 mi. S.P. 718-A, Laurens Co.—0.222 mi. F.A.P. 151, Barnwell Co.—treated timber structural steel overhead bridge, F.A.P. 89 (reopened), Kershaw Co.—widening 2 rein.-con. bridges, F.A.P. 10 (reopened), Lancaster Co. B. M. Sawyer, comr.

Streets and Roads (Continued)

Tennessee—Aug. 9, by State Dpt. Hys. & P. Wks., Nashville, paving 35.31 mi. roads in Shelby, Haywood, Hardin, Henderson, Davidson, and Hamilton Counties—grading 54.819 mi. roads in Wayne, McMibb, McNairy, Hardin, Cumberland, Tipton and Rhea Counties—bridges in Dickson, Marshall, Williamson and Warren Counties. R. H. Baker, hy. comr.; adv. E. N.-R. July 25.

Texas—July 31, by G. Gilchrist, state hy. engr., Austin, improving 110.898 mi. hys. in Austin, Baylor, Carson, Eastland, Fayette, Hudspeth, Reeves, San Patricio, and Trinity Counties. $1,310,500.

Texas—Aug. 1, by G. Gilchrist, state hy. engr., Austin, improving 92.76 mi. hys. in Anderson, Burnet, Gray, Grayson, Harris, Henderson, Kinney, Limestone, Tarrant, and Wharton Counties. $1,324,000.

Tex., Corsicana—Aug. 12, by C. Nash, judge Navarro Co., concrete paving 4 mi. Cardinal Rd. 1, 18 ft. $120,000. McCeendon & Purnell, Corsicana, engrs.

Tex., Gainesville—Aug. 14, by Mayor and Council, c/o H. Turner, secy., grading, curbing, guttering, storm sewers, paving 30,000 sq.yd. J. B. McCrary Co., Citizens & Savings Bank Bldg., Atlanta, Ga., and Dallas, engrs.

Tex., Kaufman—Aug. 8, by Kaufman Co., c/o C. Ashworth, co. judge, asphalt resurfacing 273,000 sq.yd. roads in Precinct 1. Terrell, Bartlett Engineers, Inc., Smith Yopng Tower Bldg., San Antonio, engrs.

Tex., San Antonio—Aug. 2, by H. Collins, engr. Bexar Co., Court House, natural limestone rock asphalt paving Deitel-Perrin Rd., W. W. White Rd., Precinct 3, and St. Hedwig Rd., Precinct 4. $30,000. P. Robertson, Court House, co. judge.

Utah, Ogden—Aug. 6, by City Comn., concrete paving 14 blocks 21st, 27th, 28th Sts., Grant, Chester, Pingree Aves. $105,000. H. G. Everett, city engr.

Utah, Provo—Aug. 1, by Comrs. Utah Co., grading, 6 in. monolithic concrete paving 1 mi. Lake View-Vineyard Rd., 16 ft. $30,000. H. Price, Provo, co. engr.

Wash., Seattle—Aug. 5, by Comrs. King Co., grading, 6 in. graveling 4.34 mi. Kenmore-Juanita Rd., $30,500; 3.24 mi. Redmond-Bear Creek Rd., $35,000, both 18 ft. T. D. Hunt, Seattle, engineer.

W. Va., Lewisburg—Aug. 3, by Court Greenbrier Co., grading, broken stone paving 12 mi, Falling Springs Dist. J. K. Monroe, co. road engr. Noted June 13.

Wisconsin and Michigan—Aug. 14, by Wisconsin and Michigan State Hy. Comns., at Council Chamber, City Hall, Marinette, Wis., improving 0.604 mi. Project M B 1 of 55-7-21 Contr. 7. H. I. Davies, Escanaba, Mich., div. engr.; adv. E. N.-R., July 25.

Wisconsin—Aug. 2, by State and Dodge, Jefferson Counties Hy. Comns., Capitol Annex, Madison, concrete paving 11.308 sq.yd. F.A.P. 444-E, Dodge Co.—4.680 sq.yd. North Center St. Beaver Dam City—graveling 807 cu.yd., also Merriman Bridge on S.A.P. 1258, Jefferson Co. W. C. Buetow, state hy. engr.

Ont., Perth—July 28, by Town Clerk, asphalt paving 13,000 sq.yd. Church, Arthur, Brock, Beckwith, Cockburn, Boulton, Nortland and Clyde Sts. $40,000.

Ont., Fort Hope—July 29, by M. U. Ferguson, town engr., paving 18,000 sq.yd.

Ont., Toronto—July 30, by S. McBride, mayor, asphalt on concrete paving Balliol St., St. Germaine and Broadway Aves.—bitulithic on concrete paving Edith Dr., Bowood and Fairlawn Aves.—guttering, concrete curbing Bowood, Broadway and St. Germaine Aves.—grading, Elvina Gardens, Avenue Rd. and Heddington Ave. $75,000. R. C. Harris, City Hall, engr.

Bids Received

California — State Hy. Comn., Sacramento, grading, paving 1.2 mi. Sacramento Co., from Larson Bros., Sonoma, $57,090 — untreated crushed gravel or stone surfacing 19.4 mi. Lassen Co., from Hein Bros. & Chittenden, Napa, $38,537—grading, asphaltic concrete paving 10.3 mi. Monterey Co., from Peninsula Paving Co., Standard Oil Bldg., San Francisco, $236,485. Noted June 27.

Calif., Burbank—Taking bids grading, concrete paving, 221,818 sq.ft. 8 in. Edison Blvd., from Oswald Bros., 366 East 58th St, Los Angeles, $50,883.

Calif., Los Angeles—Grading, curbing, 6 in. concrete paving Bloomfield St. and Diaz Ave. Impvt. Dist., from J. Tomei, 559 Madison Ave., Culver City, $33,580.

Calif., Los Angeles—Resurfacing, sanitary sewers in Hill Dr. and Loleta Ave., from J. Chutuk, Wilcox Bldg., $38,119.

Calif., Los Angeles—Los Angeles Co., grading, 7- to 9-in. concrete paving 708,254 sq.ft. A. & I. 30, from Griffith Co., Railway Bldg., $237,669.

Calif., San Diego—Common Council, July 15, curbing, walks, 6 in. asphaltic concrete paving 155,235 sq.ft. Froude St., from Griffith Co., 1308 Newton Ave., $41,573—curbing, walks, guttering 6 in. concrete paving 99,462 sq.ft. Locust and Alcott Sts., from B. Noble, J. D. Spreckles Bldg., $21,170. Noted July 4.

Indiana—J. J. Brown, dir. State Hy. Comn., Indianapolis, July 9, concrete paving 2.192 mi. Lake Co., from Sunderman Constr. Co., Gary, $62,643 est $76,231—0.62 mi. Montgomery Co., from W. J. Nees Co., Frankfort, $13,265 est. $16,743—7.095 mi. Jennings Co., from R. H. Scott, Indianapolis, $138,982 est. $151,316—11.98 mi. White and Pulaski Counties, from McMahan Constr. Co., Rochester, $192,609 est. $234,784—rock asphalt surfacing same road, from N. B. Putman Co., Fort Wayne, $266,988. Noted July 4.

Ind., Anderson—Madison Co., curbing, sewers, concrete paving Locust St., from W. C. Halstead, 1041 West 25th St., Indianapolis, $29,870. Est. $35,000.

Maryland — State Roads Comn., Baltimore, July 16, graveling 1.5 mi. Contr. AA-62, Anne Arundel Co., from J. I. Smink, Brooklyn, $18,665—3 mi. Contr. P-93, Prince George Co., from Jarboe & Haughton, Mechanicsville, $34,451—concrete paving 6 mi. Contr. AA-68, Anne Arundel Co., from Roberts Paving Co., Salisbury, $164,087—3.93 mi. Contr. K-34, Kent Co., from W. W. Truitt, Lincoln City, Del., $65,505—macadam surfacing 1 mi. Contr. M-126, Montgomery Co., from F. D. Carozza, Thomfield Rd., Govans, $14,634 — concrete shoulders on 9 mi. Contr. W-1-E, Washington Co., from Cumberland Constr. Co., Cumberland, $59,558. Noted July 11.

Md., Baltimore—Sheet asphalt on concrete paving 10,400 sq.yd. Contr. 529, from American Paving Co., Montebello Ave., $44,562.

Md., Towson—Comrs. Baltimore Co., concrete paving 0.93 mi. Pa. Ave., Group 4, from F. Carozza, Thornhill St., Govans, Baltimore, $22,207.

Mass., Boston—Dpt. P. Wks., sheet asphalt or bitulithic paving Everton St., Dorchester, from M. DeMatteo, 14 Rowe Pl., Roslindale, $20,378. Est. $25,000.

Mass., Newton—Street Comrs., paving Dedham St., south and easterly, 1,500 ft. each way, from John MacDonald Constr. Co., 250 Stuart St., Boston, $28,579.

Michigan — E. P. Crandall, resident engr., Cadillac, 2 course graveling 6.945 mi. Project MO45-14C-1, Lulanau Co., from Lulanau Co. Rd. Comn., Leland, for State Hy. Dpt., Lansing, $134,774.

Michigan — G. H. Greene, resident engr., Alpena, July 2, widening, concrete paving 2.69 mi. Projects MO6-5C-1 and MO6-5C-2, Arenac Co., for State Hy. Dpt., Lansing, from Hilding Constr. Co., Omer, $85,540 and $35,503 respectively.

Mo., St. Louis—Bd. P. Serv., City Hall, July 9, grading, concrete paving 1,120 sq.yd. alley, from Chase Constr. Co., 5230 Devonshire Ave. $3,320; 14,150 sq.yd., from Joseph F. McMahon Contg. Co., Buder Bldg., $35,628. Noted June 27.

Mo., Sikeston—P. H. Stevenson, city clk., grading, curbing, 7 in. rein.-con. paving 8,120 sq.yd. New Madrid and North Kingshighway, from Hannibal Contg. Co., Hannibal, $23,000. Noted June 27.

N. J., Bloomfield—Bd. Freeholders Essex Co., Hall of Records, Newark, July 9, 7 in. bituminous macadam paving Broad St., from Franklin Contg. Co., 20 Washington Pl., Newark, $37,100.

N. J., Trenton—Bd. Freeholders Mercer Co., July 16, from Ross & Taylor, Broad St. Bank, paving 1.1 mi. Sect. 1, Edinburg-Robbinsville Rd., Penetration macadam $49,979, concrete $49,571, Sect. 2, same road $25,365.

N. J., Union—Twp. Com., Town Hall, July 9, curbing, 7 in. rein.-con. paving Morrison Ave. from Decker Canning Co., Falls Bldg., Union, $40,970; Barbara Ave., from John Dorer & Co., 644 Nye St., Irvington, $40,756. Noted July 4.

N. Y., Brooklyn—J. J. Byrne, pres., Brooklyn Boro, Boro Hall, July 17, from D. J. McCoy Asphalt Co., Avenue U and East 57th St., asphalt paving Bay St. $8,122—from B. Turecamo Contg. Co., New Cropsey Lane, East 52nd St. $11,845; Fenimore St. $14,358; Rutland Rd. $11,002; Avenue L $6,066; 13th Ave., $4,617; East New York Ave. $7,270—from Uvalde Asphalt Paving Co., 1 Bway., New York, Farragut Rd. $42,174—from C. Bennett Impvt. Co., Inc., regulating East 55th St. $2,484—from Castle Bros., Inc., Johnson Pl., Fenimore St. $7,850—from J. Casalino, 211 North 7th St., Flatlands Ave. $8,774—from C. & R. Contg. Co., 2266 Gravesend Ave., 14th Ave. $2,017—from J. C. Dempsey, 516 Prospect Ave., Flatlands Ave. $28,227—from G. P. McDermott, 1770 Carroll St., Avenue L $2,871—from M. F. Hickey Co., 83 9th St., Avenue U $49,857—from J. Monohan, 1921 Morris Ave., New York, Vermont Ave., $4,260. Noted July 11.

N. Y., Long Island City—Park Dpt., W. R. Herrick, pres. Park Bd., Arsenal Bldg., Central Park, New York, July 16, sidewalks along main drive between Union Turnpike and Metropolitan Ave., from M. J. Mastantueno, 1163 61st St., Brooklyn, $5,407; reconstructing approaches to bridge carrying main drive in Forest Park, from Uvalde Asphalt Paving Co., 1 Bway., New York, $15,847. Noted July 11.

N. Y., New York—H. Bruckner, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., July 17, from Charles D. Beckwith, Inc., Seneca Ave. and Edgewater Rd., asphalt paving Riverdale Ave., $190,605—from Asphalt Constr. Co., 2197 Madison Ave., Whitlock Ave., $32,247; Casanova St. $11,876; East 172nd St. $10,339; East 174th St. $10,490—from Knight & De-Micco, Inc., 448 East Tremont Ave., sewers in Griswold Ave. $35,530 — from Gallat Constr. Corp., Harper Ave. $15,909; Bouck Ave. $12,778—from Remo Eng. Corp., 645 Tremont Ave., grading Kimberly Pl., $5,230—from P. Salamone, 5,000 bags portland cement, $3,038. Noted July 11.

N. Y., St. George—J. A. Lynch, pres. Richmond Boro, Boro Hall, July 17, from Trifoglio Constr. Co., granite paving Richmond Terrace $16,919; sidewalks on Targee St. $6,725; sewer in Bryant Ave. $5,692—from Vanbro Constr. Co., 24 Elizabeth St., West Brighton, 1,500 tons bituminous concrete $19,350. Noted July 11.

Utah—State Hy. Comn., Salt Lake City, grading, graveling 2.063 mi. Lambs Canyon Rd., Salt Lake Co., from O. Nelson, Logan, $34,036. Est. $34,993.

Contracts Awarded

Ark., Hope—Lake **Asphalt** on concrete paving 18,000 sq.yd. Annex 1 **Street** Paving Impvt. Dist. 11, and curbing, **guttering** 11,000 ft. Dist. 7, to C. S. Constance Co., **Hope**, $59,800. Est. $60,000.

Ark., Little Rock—Grading Eureka surfacing 15,000 sq.yd. Marshall Street Annex to Paving Dist. 349, to P. F. Connelly Paving Co., Home Insurance Bldg., $52,511.

Ark., Osceola—Comrs. Mississippi Co., grading 115,000 cu.yd., graveling 70,000 cu.yd., concrete culverts on 4,000 ft. Carson Lake Rd. Impvt. Dist. 6, Contrs. 1 and 3, to W. J. Bryson Paving Co., Birmingham, Ala., $48,378 and $49,500 respectively; Contr. 2, to Louis Nailling, Osceola, $7,140. Grand total $107,018. Noted July 4.

Calif., Glendale—Grading, curbing, walks, 5 in. concrete paving, 37,296 sq.ft. Gladys Dr. et al, to Cambell-Reichert Co., 1133 South Fremont St., Alhambra, $46,190.

Calif., Los Angeles — Grading, oil surfacing 466,610 sq.ft. Coldwater Canyon Rd. A. & I. 218, to B. W. Kuhn, 2900 Santa Fe Ave., $99,018. Est. $91,260. Noted June 13.

Calif., Los Angeles—Bd. P. Wks., grading, concrete, warrenite-bitulithic paving 3rd St., to Western Roads Co., Los Angeles, $195,557.

Calif., Los Angeles—Grading, curbing, walks, 5 in. National paving 534,417 sq.ft. Bedford St. and Adams Blvd. Impvt. Dist., to Los Angeles Paving Co., 3200 East Vernon Ave., $199,619.

Calif., Montebello—Grading, curbing, walks, asphaltic concrete paving 276,512 sq.ft. Cleveland Ave. to Hall-Johnson Co., 905 Westminster Ave., Alhambra, $29,945.

Calif., Newport Beach—Curbing, guttering, 6 in. warrenite bitulithic paving 737,509 sq.ft. in Lido Island, to Underground Constr. Co., 2210 Hyperion St., Los Angeles, $1,110,950. Noted June 20.

Calif., Palo Alto — Grading, concrete paving Forest Court, to M. S. Hanrahan, Standard Oil Bldg., San Francisco, $35,605. Noted June 27.

Calif., San Diego—Improving Avalon St., to Daley Corp., 4430 Boundary St., $102,174.

Calif., San Diego—Common Council, grading, curbing, 6 in. concrete paving 333,711 sq.ft. Castellar St., to Daley Corp., 4430 Boundary St., $102,174. Noted June 20.

Calif., San Diego—Common Council, improving 54th, other streets, to B. Noble, J. D. Spreckels Bldg., $97,981. Noted June 27.

Calif., San Diego—Common Council, grading, curbing, 6 in. concrete paving 77,417 sq.ft. Ingraham St., to Watson & Sutton, Box 396, $27,567.

Calif., San Fernando—Curbing, walks, lighting system, 6 in. concrete paving 10,000 sq.ft., 8 in. asphaltic concrete paving 177,070 sq.ft. Porter Ave., to Southwest Paving Co., Washington Bldg., Los Angeles, $50,136. Est. $50,250. Noted June 27.

Calif., Santa Monica—Grading, asphaltic concrete paving Ocean Park Blvd., to Kneen Paving Co., Dudley Bldg., $186,870.

Calif., South Pasadena—Concrete paving, watermains, vitr. sewers in Brunswick Ave., to A. D. Chalmers, 2610 San Fernando Rd., Los Angeles, $59,100. Noted July 18.

Idaho—J. D. Wood, comr. State Dpt. P. Wks., Boise, grading 56,000 cu.yd. Roosevelt Hy. between Antelope Springs and Granite Creek to Wm. Hoops, Twin Falls, $58,142. Noted June 27.

Ill., Alton—For 7 in. rein.-con. paving 12th, 13th, 15th, 16th and McGuan Sts., to J. B. Miller, Alton $16,464; sewers in 13th, 15th and McGuan Sts., to J. T. Dennison, Alton, $2,530. Noted June 13.

Ill., Evanston—Bd. Local Impvts., sidewalks, concrete paving 1,315 sq.yd. alleys, grading, curbing, guttering, sewers, concrete paving 47,200 sq.yd. Dodge Ave., to M. Foley, Evanston, $4,901 and $245,117 respectively.

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Streets and Roads (Continued)

Ill., Joliet—Will Co., grading, rein.-con. paving 8,260 sq.yd. Washington St., to J. V. McCarthy Co., Joliet, $38,151. Noted May 16.

Indiana—State Hy. Comn., Indianapolis, concrete paving 5.26 mi. Project 177-B. DeKalb Co., 18 ft., to R. L. Harris, State Rd., Ft. Wayne, $101,291. Est. $118,548.

Ind., Logansport—Bd. Wks., concrete paving East Broadway and Spencer Sts., to D. A. Hyman & Sons, Logansport, $54,527.

Ind., South Bend—St. Joseph Co., concrete paving Riley Rd., to J. McCarthy, Benton Harbor, Mich., $11,000—Douglas Rd., to Concord Constr. Co., Elkhart, $45,947—Ear Rd. and Main St., to H. Reed & Son, Mishawaka, $50,500. Grand total $118,447. Noted June 20.

Iowa—State Hy. Comn., Ames, grading flumes, paving 83.599 sq.yd. roads in Black Hawk Co., to McKenzie & Kileen, Superior, Wis., $193,390—129,399 sq.yd. Carroll Co., to Wright Constr. Co., 1325 Main St., Des Moines, $326,550—212,045 sq.yd. Dubuque Co., to A. Johnson Constr. Co., Minneapolis, Minn., $646,483—127,879 sq.yd. Linn Co., to Des Moines Asphalt Paving Co., 2nd and New York Sts., Des Moines, $314,346—107,921 sq.yd. Lucas Co., to Natl. Constr. Co., 305 Arthur Bldg., Omaha, Neb., $299,145—125,342 sq.yd. Webster Co., to Henkel Constr. Co., Mason City, $297,254—graveling 23.5 mi. Carroll Co., to H. R. Maudlin, Nevada, $14,453—14.2 mi. Ida, Woodbury and Monona Counties, to H. Eldridge, Clemons, $21,878—8.86 mi. Muscatine Co., to H. J. Dane, Iowa City, $11,750—5,290 ft. 6- to 12-in. tile complete on road in Emmet Co., to A. Eikwald, Emmetsburg, $709. Grand total $2,125,957. Noted June 11.

Iowa—State Hy. Dept., to McDougall Constr. Co., Sioux City, maintenance graveling roads in Woodbury Co. $4,246; Monana Co. $12,935, Plymouth Co., $3,938; Crawford Co., $11,401—to G. Cronkhite, Perry, 4,120 ft. guard rail in Polk Co. $114. Grand total $32,634.

Ia., Cedar Rapids—Asphaltic concrete paving 18,600 sq.yd. 3rd Avenue W. to Ford Paving Co., Merchants Natl. Bank Bldg., $58,467.

Ia., Charles City—Rein.-con. paving 30,000 sq.yd., to Booth & Olson, Inc., 318 Grain Exch. Bldg., Sioux City, at $1.78 per sq.yd.

Ia., Clinton—F. W. Leedham, city clk., grading, curbing, guttering, 7 in. rein.-con. paving North and South 4th Sts., to Star Coal & Impvt. Co., Hobson and Farragut Sts., Davenport, $32,394. Noted June 23.

Ia., Davenport — Sheet asphalt paving 2 streets, 6 in. rein.-con. paving 8 alleys, to Star Coal & Impvt. Co., 2501 Blackhawk St.—6 in. rein.-con. paving 1 street, to Ryan Constr. Co., 1st Natl. Bank Bldg.—4 streets, to W. D. Phelan, Citizens Bank Bldg.,—8 in. rein.-con. paving 1 street, brick paving 6 streets and 6 in. rein.-con. paving 3 alleys, to Central Eng. Co., 2531 Rockingham Rd. Noted May 30.

Ia., Davenport—See "Bids Asked."

Ia., Iowa City—G. J. Dohrer, city clk., grading curbing, guttering, 7 in. rein.-con. paving 8,530 sq.yd. 5 streets and 2 avenues to William Horrabin Contg. Co., 16 East College St., Iowa City.

Ia., Keokuk—Concrete paving 10,645 sq.yd. 4 streets, to F. L. Griffey, Keokuk; 4,621 sq.yd. paving 2 streets, to Cameron, Joyce, Smith & Elder Co., Keokuk. Noted June 27.

Ia., **Manchester**—Delaware Co., graveling 8 mi. secondary roads, to M. O. Weaver, Iowa Falls, $16,526.

Ia., Mt. Pleasant—Grading, curbing, 6 in. concrete paving 12,500 sq.yd., to Des Moines Asphalt Paving Co., 2nd and New York Sts., Des Moines, $37,243. Noted July 4.

Ia., **Oskaloosa** — Mahaska Co., graveling roads, to Harvey Sand & Gravel Co., Harvey, $19,788; and to F. Mathews, Oskaloosa, $2,023.

Ia., Webster City—Hamilton Co., graveling roads, to D. Paul, Ft. Dodge, $2,658; to H. Pickus Constr. Co., Sioux City, $3,841; and to Nelson & Melohn, Nevada, $13,974. Grand total $20,473. Noted June 30.

Kansas—State Hy. Comn., Wamego, concrete paving 9.096 mi. roads in Leavenworth Co., to J. A. Tobin Constr. Co., Kansas City, Kan., $226,910—roads in Pottawatomie Co., to M. R. Amerman, 248 North Market St., Wichita, $40,626—grading, culverts 5.878 mi. Osage Co., to A. L. Cook, Ottawa, $31,806—5.216 mi. Pottawatomie Co., to J. J. Lamoreaux, Omaha, Neb., $78,599. Grand total $377,941. Noted June 20 and June 27.

Kentucky—State Hy. Dept., Frankfort, grading 4.138 mi. Russellville Central City Rd., S.P. 15-BG, Logan Co., to Carter, Carter & Braden, Clay, $71,390. Noted Mar. 28.

Ky., Louisville — Bd. P. Wks., constructing streets. Letting 944, 6 contracts, to George M. Eady Co., Brook and Lee Sts., $38,179—8 contracts, to Henry Bickel Co., 435 Garden St., $51,245—7 contracts, to Louisville Asphalt Co., 240 East Lee St., $52,496—4 contracts, to F. G. Breslin Co., 32nd and Market Sts., $23,083—5 contracts, to Andrews Asphalt Paving Co., Inc., Inter-Southern Bldg., $23,245. Grand total $118,250. Noted June 20.

Ky., Louisville—Bd. P. Wks., constructing alleys. Letting 945, 3 contracts, to Woodruff & Co., 1050 Barrett Ave., $3,514—8 contracts, to

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J. U. Schickli & Bros., 1837 Greenwood Ave., $19,912—3 contracts, to J. W. McFarland, 1220 River Rd., $4,150—3 contracts, to E. Brewer, 1233 West Jefferson St., $4,356. Grand total $31,932.

Louisiana—State Hy. Comn., Baton Rouge, concrete paving 3.107 mi. Ascension Parish, to Moore Bros., New Orleans, $86,507—19.3 mi. Richland and Madison Parishes, to Miller & Hutchinson Co., Ocean Springs, Miss., $420,348—10.927 mi. Lincoln Parish, to Nelson Bros., Memphis, Tenn., $272,302—9.077 mi. Lafayette Parish, to W. L. Pearson & Co., Edinburg, Tex., $193,298. Grand total $972,455. Noted June 6.

La., Opelousas—Police Jury, St. Landry Parish, constructing graveled road Sections 1, 2, 3 and 5, to Picard Constr. Co., New Orleans, $81,057—Sect. 4, same road, to I. M. Goldberg, Jeanette, $25,128—furnishing gravel, to Natl. Sand & Gravel Co., Amite, $67,528. Grand total $173,713.

La., St. Joseph—Police Jury Tensas Parish, clearing, grubbing, grading, bridging, gravel surfacing 5.1 mi. Tensas Bluff South Rd., to Midland Constr. Co., Clarksdale, $40,000. Noted June 6.

Maryland—State Roads Comn., Baltimore, concrete paving 2.37 mi. Contr. H-67, Harford Co., to P. D. Phillips & Bro., Salisbury, $53,875. Noted June 6.

Maryland — State Roads Comn., Baltimore, concrete paving 1.7 mi. Contr. M-122, Montgomery Co., to M. J. Grove Lime Co., Lime Kiln, $37,649—1.53 mi. Contr. Wo-47, Worcester Co., to Hannemann-Burroughs Co., Salisbury, $26,274—amiesite surfacing 0.47 mi. Contr. W-63, Washington Co., to Long Tenny & Co., Inc., Hagerstown, $17,200. Grand total $81,123. Noted July 4 and 11.

Maryland—State Hy. Comn., Baltimore, concrete paving 8.3 mi. Contr. K-38, Kent Co., to George & Lynch, Dover, $115,397.

Md., Baltimore—Granite block repaving 13,450 sq.yd. Contr. 528, to D. Marine, 238 Albemarle St., $46,110.

Md., Baltimore—Bd. Awards, concrete paving 20,000 sq.yd. footways. Contr. 114, to P. Averza, 104 North Highland Ave., $35,378; 9,800 sq.yd. Contr. 135, to J. Leone, 2231 Walbrook Ave., $18,983. Noted June 27.

Md., Chesterton—Kent Co., slag paving 47.3 mi., to Russell & Major, Frederick, $101,350. Noted July 4.

Massachusetts—Dpt. P. Wks., Boston, gravel and bituminous macadam paving 4,200 ft. hy. Spencer, to Hagan & Thibodeau Constr. Co., 45 Waterman Ave., Eden Park, R. I., $15,263—4,000 ft. Petersham, to Catanese Constr. Co., Fitchburg, $11,957—bituminous macadam paving 11,772 ft. Essex, to O. Menici, 27 Martinach Ave., Peabody, $81,336—4,518 ft. Salem, to Higgins & Collins Co., Central Bldg., Lawrence, $40,834—6,200 ft. Kingston, to A. D. Bridges & Son, Hazardville, Conn., $26,380. Grand total $175,770. Noted July 4.

Mass., Brookline — Sheet asphalt paving Henry, Sheafe and Thatcher Sts., to J. J. McCarthy & Co., 120 Boston St., Dorchester, $23,605. Est. $25,000.

Mich., Detroit—Dpt. P. Wks., concrete paving 19,800 sq.yd. airport aprons, French and Lynch Rds., to Otis Cement Constr. Co., 2956 Penobscot Bldg., $40,123. Noted May 23.

Mich., Detroit—Dpt. P. Wks., to Cleveland Trinidad Paving Co., 715 Hammand Bldg., grading, curbing, 3½ in. sheet asphalt on 8 in. concrete paving Appoline Ave., $17,030; Ward Ave., $10,822; Littlefield Ave., $13,284; Snowden Ave., $12,920; Hartwell Ave., $27,998—to Detroit Asphalt Paving Co., 909 Transportation Bldg., Vaughan Ave., $16,549; Hildale Ave., $10,553; Evanston Ave., $26,266. Grand total $135,422.

Minn., Dawson — Paving 8,803 sq.yd. Main St., to Woodrich Constr. Co., 808 Metropolitan Life Bldg., Minneapolis, $26,749.

Miss., Durant—Grading, curbing, concrete paving, to Dunn Constr. Co., Lincoln Life Bldg., Birmingham, Ala., $75,000.

Miss., Kosciusko—Warrenite on 5 in. concrete paving 8,960 sq.yd. North Jackson, Railroad and West Jackson Sts., to Barber Bros. Constr. Co., Kosciuski and Oxford, at $2.23 per sq.yd.

Miss., Vicksburg—Bd. Supervs., Warren Co., improving 0.051 mi. Federal Aid Project 201-B, to Badgett Constr. Co., Cedar Bluff, Ala., $71,262. Noted July 4.

Mo., Clayton—Clerk St. Louis Co., Court House, rein.-con. paving 34,000 sq.yd. Laclede Station Rd., to Chicago Ridge Co., 14 South Central Ave., $98,288; 50 ft. rein.-con. bridge over Cold Water Creek, on Halls Ferry Rd., to J. L. Moss, 1908 North and South Rd., Brentwood, $15,889. Noted June 27.

Mo., Clayton—A. H. Kerth, city clk., rein.-con. paving 7,900 sq.yd. Forsythe St., to Ansbro & Maguire, Title Guaranty Bldg., St. Louis, $26,957; 15,850 sq.yd. North and South Rd., to Stiers Bros. Constr. Co., 2944 Magazine St., St. Louis, $63,040. Noted June 6.

Mo., Moberly—For 2 in. amiesite resurfacing Johnson St. between Rollins and Coates Sts., to Lynch-McDonald Constr. Co., Moberly, $11,733. Noted June 23.

Mo., St. Louis—Concrete paving, sidewalks on Arsenal Viaduct, to Crean & Scott Constr. Co., 1242 Sublette Ave., $58,844.

Mo., St. Louis—Bd. P. Serv., City Hall, to Webb-Boone Paving Co., 5103 Fyler Ave., amiesite paving 4,740 sq.yd. 4th St., $17,516; 1,675 sq.yd. Osage St., $13,945—to Central Paving & Constr. Co., 411 North 7th St., warrenite bitulithic paving 4,410 sq.yd. Horton Pl., $24,766; 955 sq.yd. Newstead Ave. $8,200; 1,210 sq.yd. Detony St. $9,425—to Granite Bituminous Paving Co., Ry. Exch. Bldg., 4,010 sq.yd. Lemp Ave., $29,033—to Flinn Paving Co., 1405 South 4th St., asphalt paving 2,560 sq.yd. Utah St. $18,740; 3,755 sq.yd. January St. $25,425—to C. A. Moreno Co., Syndicate Trust Bldg., asphaltic concrete paving 1,620 sq. yd. Miami St. $10,870; 1,340 sq.yd. Enright St. $9,280—to Crean & Scott Constr. Co., 1242 Sublette Ave., 2,585 sq.yd. Odell St. $16,403—to Bridges Asphalt Paving Co., 1470 Kentucky Ave., 360 sq.yd. Fairground Pl. $2,888—to Trinidad Asphalt Mfg. Co., 600 South Theresa Ave., 1,495 sq.yd. Penrose St., $11,101—to William A. Riley Constr. Co., 110 North 7th St., vibrolithic concrete paving 1,025 sq.yd. Chester St. $6,054. Grand total $203,646. Noted June 13.

Mo., University—E. B. Colby, city clk., rein.-con. paving 3,730 sq.yd. West Roadway, to Kersting & Gray, c/o City, City Hall, $22,363—asphaltic penetration surfacing 400 sq.yd. Asbury St., 365 sq.yd. Chamberlain Ave., to Fehlig & Ferrenbach, Inc., Clayton Arcade Bldg., Clayton, $1,577 and $1,503 respectively—1,520 sq.yd. Jackson Ave., to Pathfinder Serv. Inc., 8010 Forsythe Blvd. $5,892—rein.-con. bridge over River Des Peres, Midland Blvd., to Missouri Bridge & Iron Co., Fullerton Bldg., St. Louis, $13,646. Grand total $44,981.

Mo., University—For 7 in. rein.-con. paving 11,905 sq.yd. Gannon Ave. and 3,810 sq.yd. Warder Ave., to Kunze Constr. Co., 5926 Scanlon Ave., St. Louis, $43,377 and $13,086 respectively; concrete paving 460 sq.yd. 1 alley, to Fehlig-Ferrenbach, Inc., Clayton Arcade Bldg., Clayton, $1,303. Grand total $57,766.

N. J., East Orange—City Council, City Hall, recurbing, sheet asphalt on present Telford paving Amhurst St., to R. S. Sowerbutt, 436 Belmont Ave., Paterson, $25,437.

N. J., Emerson—Bd. Boro Council, concrete curbing, sidewalks, in Railroad and Palisades Aves., to J. De Brigida, 65 Hudson St., Hackensack.

N. J., Jersey City—Bd. City Comrs., City Hall, granite block paving Communipaw Ave., to Municipal Constr. Co., Labor Bank Bldg., 77¼% $25,000 appropriation; Stagg St., to Uvalde Asphalt Paving Co., 2 Greene St., 79¼% $25,000 appropriation.

N. J., Metuchen—Middlesex Co., County Record Bldg., New Brunswick, curbing, guttering, rein.-con. paving Amboy Ave., to Toriello & Purdy, 16 West Ft. Lee Rd., Bogota, $280,847. Noted June 27.

N. J., New Brunswick — City Comrs., City Hall, paving 8 streets, to Utility Constr. Co., 5 Spring St., $124,536. Noted July 10.

N. J., Paterson—Bd. City Comrs., City Hall, grading, curbing Caldwell Ave. and Howard St., to P. Kramer, 45 Church St., Paterson, $18,352; Dixon Ave., to W. Ferguson Sons, 152 Market St., $7,142. Noted May 23.

N. J., Union—Township Comn., Town Hall, recurbing, 7 in. rein.-con. paving Barbara Ave., to J. Dorer, 644 Nye Ave., Irvington, $40,756. Noted July 4.

N. J., Westfield—Town Council, Town Hall, 8 in. rein.-con. paving Hardwick Ave., to J. Logouito, 583 1st St., $42,326.

N. J., West New York—Bd. Town Council, Town Hall, bituminous concrete paving 13th Ave., to R. Mazzoni, 566 9th St., West New York, 65% est. $22,822.

New York—A. W. Brandt, comr. Hys., Albany, grading road in Chautauqua Co., to I. V. A. Huie & R. E. Dutcher, Saugerties, $363,750 est. $528,108—bituminous macadam paving Essex Co., to N. E. Young, Union, $256,875 est. $371,720—2.72 mi. Seneca Co., to F. Callahan, Auburn, $95,953 est. $121,423—concrete paving 0.91 mi. Nassau Co., to Johnson, Drake & Piper, Inc., Merrick Rd., Freeport, $375,119 est. $473,547—4.55 mi. Allegany Co., to C. A. Foote & Son, Mt. Morris, $135,651 est. $194,909—2.17 mi. Schuyler Co., to Rochester Concrete Constr. Co., Inc., $169,947 est. $239,856—1.5 mi. Herkimer Co., to Law Bros. Contg. Corp., 200 North Main St., Herkimer, $71,986 est. $95,006—3.1 mi. Suffolk Co., to R. W. S. Corp., Huntington, $454,538 est. $526,706—7.64 mi. Orange Co., to Lane Constr. Co., 37 Colony St., Meriden, Conn., $328,192 est. $486,398—concrete bituminous macadam paving 1.27 mi. Suffolk Co., to Riteway Constr. Corp., 299 Bway., New York, $139,514 est. $185,682. Grand total $2,391,525. Noted June 13.

N. Y., Brooklyn—J. J. Byrne, pres. Brooklyn Boro, Boro Hall, grading East 26th and 67th Sts., to W. J. McHale Contg. Co., 1250 Jefferson Ave., $27,392 and $1,703 respectively—Scholes St., to Grimm Contg. Co., 170 McKinley St., $2,831—asphalt paving Rockaway Ave. and Rockwell Pl., to Uvalde Asphalt Paving Co., 1 Bway., New York, $56,142 and $9,675 respectively. Grand total $97,743. Noted June 20.

Streets and Roads (Continued)

N. Y., Brooklyn — Park Bd., W. R. Herrick, pres. Park Dpt., Arsenal Bldg., Central Park, New York, improving Lincoln Rd., to Brooklyn Alcatraz Asphalt Co., 407 Hamilton Ave., $23,654—cement walk in Clinton Park, to A. De Geronimo, $5,460—improving unnamed playground, 7 East 13th St. and Ave. S., to P. J. Hand, 510 Smith St., $9,585. Grand total $38,599. Noted June 27.

N. Y., Buffalo—Dpt. P. Wks., City Hall, sheet asphalt paving 25,831 sq.yd. roadway in and around airport, to Erie Contg. Co., Morgan Bldg., $69,390. Noted May 2.

N. Y., Canandaigua—Paving West Ave. from Pearl St. to city line, to F. E. Cass, Rochester, $37,876.

N. Y., New York—H. Bruckner, pres. Bronx Boro. Crotona Park, 3rd and Tremont Aves., granite block paving West 170th St., to Meehan Paving Co., 90 West St., $32,685—Exterior St., to Leonard Paving Co., 223 Bway., $14,093—grading East 224th St. and setting curb Wilson Ave., to F. Mascali & Sons, 645 East Tremont Ave., $5,717 and $3,906 respectively. Grand total $55,401. Noted July 4.

N. Y., New York—J. Miller, pres. Manhattan Boro. Municipal Bldg., granite block paving Platt St., to Meehan Paving & Constr. Co., 90 West St., $12,619—Marginal St., to St. George Paving Co., 415 Lexington Ave., $215,816—asphalt block paving Ellwood St., to Valatia Constr. Co., 15 East 40th St., $11,162—West 186th St., to C. D. Beckwith, Inc., Seneca Ave. and Edgewater Rd., $11,208. Grand total $250,805. Noted June 27.

N. Y., New York—Park Bd., W. R. Herrick, pres. Park Bd., Arsenal Bldg., Central Park, sheet asphalt paving south driveway, Bronx and Pelham Parkways, to C. D. Beckwith, Inc., Seneca Ave. and Edgewater Rd. $16,895. Noted June 27.

N. Y., Rochester—Asphalt paving Raleigh St. between White St. and Farmington Rd., to John Petrossi Constr. Co., 6 State St., $55,546.

Ohio—R. N. Waid, dir. Hys., Columbus, brick paving, incl. crick 1.62 mi. Summit Co., to McCourt Constr. Co., Akron, $72,639—brick paving 0.255 mi. Cuyahoga Co., to Enterprise Paving Co., 8436 Bway. Ave., Cleveland, $30,598.

O., Akron.—Comrs. Summit Co., grading, traffic bound slag paving 5.17 mi. Akron-North Canton Rd., to T. L. Smith, 1958 Newton St., $51,784. Est. $65,000.

O., Brooklyn (br. Cleveland)—Village, paving 12 streets, to N. Siegel, Western Reserve Bldg., Cleveland, $320,000.

O., Canton—Stark Co. slag paving 4 mi. Canton Magnolia Rd., 18 ft., to K. Miller, 347 Clarendon Ave. N. W., $29,122. Est. $30,000.

O., Canton—Stark Co., brick paving 1.43 mi. Brewster-Justus Rd., 18 ft., to H. Wise, 1126 11th St. N. W., $59,236. Est. $60,000.

O., Canton—Stark Co., curbing, brick paving 1.5 mi. Lincoln Hy., to E. Vogt Constr. Co., Massillon, $112,495. Est. $120,000.

O., Cleveland—Oil asphalt paving Allien Ave. and West 178th St.—also brick paving Carrington and Ponciana Aves., 162nd and 165th St., to Roehl Bros., 7002 Denison Ave., $11,610 and $61,568 respectively—Gennett Ave., to Baldwin Bros., Union Trust Bldg., $5,487—East 70th St., to Rieley Bros., The Arcade, $21,170—concrete paving Eliot Ave., to Enterprise Paving & Constr. Co., 8444 Bway., $7,853. Grand total $107,689.

O., Cincinnati—C. O. Sherrill, city mgr., concrete repaving 1,164 ft. McKeone Ave., to Gradison Constr. Co., 1st Natl. Bank Bldg., $30,545, est. $30,545; asphalt repaving—2,352 ft. 5th St., to Holmes Constr. Co., 4110 Langland Ave., $70,651 est. $89,508. Noted May 23.

O., Cleveland—Cuyahoga Co., asphaltic concrete paving 20,860 sq.yd. Noble Rd., 2, to Cleveland Trinidad Paving Co., Western Reserve Bldg., $114,549. Est. $130,000; penetration waterbound macadam paving 10,035 sq.yd. Puritas Springs Rd., to Hannon Constr. Co., 19700 South Woodland Rd., $20,857. Est. $26,700.

O., Cleveland—Bd. Comrs., Cuyahaga Co., asphaltic macadam paving Gates Mills Blvd., to Cleveland Trinidad Paving Co., Western Reserve Bldg., $581,405.

O., Euclid (br. Cleveland)—Oil asphalt paving 5 streets, to Cleveland Trinidad Paving Co., Western Reserve Bldg., Cleveland, $53,000.

O., Lakewood (br. Cleveland)—Oil asphalt resurfacing Cook, Clarence and Wyandotte Aves., to Cleveland Trinidad Paving Co., Western Reserve Bldg., Cleveland. Est. $30,000.

O., Oakwood (Dayton P.O.)—Sheet asphalt on concrete paving 3,000 ft. Hadley Ave., to R. P. Sebold, West Riverview St. and Pennsylvania R.R., Dayton, $25,175.

O., Yorkville—City Council, concrete paving Martha, St. Clair and Short Sts., to Stringer & Springer, Wheeling, W. Va., $37,000.

Okla., Altus—J. M. McKinley, city clk., grading, concrete paving 6 in. 8,800 sq. yd. North Commerce St., to Highway Constr. Co., Daniels Bldg., Tulsa, $24,980. Est. $25,000. Noted June 27.

Okla., Kaw — Kay Co. (Newkirk), grading, concrete paving 16,346 sq.yd., to Southwestern Constr. Co., Ponca City, $38,161. Est. $40,000.

Okla., Tulsa—Grading, concrete paving Dist. 951, to H. L. Cannady, 116 South Lewis St., $28,584; Dist. 952, to C. Pleasant, 229 North Nogales St., $20,620.

Pa., Phila.—Dpt. P. Wks., Bureau Hys., A. Murdock, dir., to Barber Asphalt Co., Hunting Park Ave. at E St., asphalt paving (assessment work), Comly and Levick Sts., $42,648—to Mack Paving & Constr. Co., Nicetown Lane and Luzerne St., Sparks St. $4,182—to Union Paving Co., 123 South 21st St., Sydenham St. $1,592; 71st St. $8,282; asphalt repaving 3rd St. $39,864; redressed granite repaving track area 20th St. $7,995—to Curtis Bros., State and Unruh Rds., concrete and bituminous macadam paving Disston St. $3,436; Levick St. $11,001—to Montgomery Paving Co., Harrison Bldg., asphalt repaving 4th St. $31,951—to Municipal Constr. Co., Washington Square Bldg., 25th St. $3,788; 62nd St. $17,489—to C. G. Centrone, 528 North 65th St., redressed granite block repaving Somerset St. $17,114. Grand total $189,342.

Pa., Pittsburgh—Allegheny Co., rein.-con. paving 12,920 sq.yd. Babcock Blvd., Millvale, to Wilkinsburg Constr. Co., 7630 Kelly St., $87,230—29,300 sq.yd. Mowry-Gill Hall Cochrane Mills Rd., to J. W. Butler, Port Vue Rd., McKeesport, $143,353—asphalt paving 21,296 ft. Ohio River Blvd., to Booth & Flinn, 1942 Forbes Bldg., $3,344,848—concrete wearing surface on 9,000 sq. yd. Bradford Ave. and Wexford Run Rd., to Harrison Constr. Co., 21st and Sidney Sts. $22,230. Grand total $3,597,661.

Tex., Houston—For 2 in. rock asphalt paving 48,400 sq.yd. Clinton Dr. and 22,300 sq.yd. Leeland Ave., to National Paving Co., 112 Buffalo St., $137,244 and $61,535 respectively.

Tex., Ft. Worth—Asphalt paving Bradford and Calhoun Sts., Harley and Brechman Aves., to West Texas Constr. Co., Cotton Exch. Bldg., $30,589. Est. $30,000.

Tex., San Angelo—For 1½ in. hot mix on 9 in. macadam paving 9 blocks 5th and Chadbourne Sts., to Thompson & Simpson, San Angelo. Est. $44,000. Noted Feb. 21.

Utah, Salt Lake City—Concrete paving 14,450 sq.yd. 15th St. East and Garfield Ave., to Gibbons & Reed, Salt Lake City, $41,241. Est. $51,544.

Virginia—State Hy. Dpt., Richmond, sheet asphalt paving 1.331 mi. Arlington Co., to Corson & Gruman, 33rd & K Sts., N. W., Wash., D. C., $46,884—grading 10.737 mi. King William Co., to Perkins & Barnes, Blackstone, $32,623—bituminous macadam paving 3.011 mi. Pittsylvania Co., to Rhoades & Walters, Culpeper, $84,741—macadam paving 3.743 mi. Clarke Co., to Battershill & Terry, Virgilina, $67,670—0.865 mi. Frederick, Warren and Shenandoah Counties, to Carpenter, Major Bros. & Co., Inc., Clifton Forge, $49,778—bridge over Thornton River, Rappahannock Co., to Roanoke Iron & Bridge Wks., Roanoke, $5,278. Grand total $286,974. Noted July 4.

W. Va., Beckley — Raleigh Co. Court, constructing Glen Daniels-Skin Poplar Gap Rd., to Eccles Constr. Co., Cass, $99,600. Noted June 27.

W. Va., Montgomery—City Council, bituminous asphalt concrete paving Montgomery and Fayette Pike, to Federal Asphalt Co., Hamilton, O., $90,000.

B. C., Coquitlam—Constructing relocated Dewdney Frank Rd. from Pitt River Bridge to Hunter Rd., to Fraser Constr. Co., Ltd., New Westminster, $29,056.

B. C., Whonnock—Reconstructing 3.75 mi. Dewdney Trunk Rd., to Ellis Cotton Ltd., False Creek Yards, $89,954.

Ont., Oshawa—Asphalt paving 25,000 sq.yd., to Standard Paving Co., Central Chambers, Ottawa. Est. $100,000.

Ont., Ottawa—Asphalt paving 5th Ave., Queen Rideau and Waller Sts., to Standard Paving Co. Ltd., 53 Elgin St., $103,700. Noted May 2.

Ont., Ottawa—To Standard Paving Co., Central Chambers, asphalt on concrete paving 5th Ave., $23,000; Rideau St., $20,000; Queen St., $90,000—to owner by day labor, Bank St., $10,000. Est. $143,000.

Ont., Sault St. Marie—R. G. Campbell, city clerk, concrete curbing, concrete paving, to A. Wood, 102 Queen St., $50,000.

Ont., Toronto—East York Twp., sheet asphalt paving Eldon, Gledhill, Arundel, Barrington, Coxwell, Jackman, Nialon and Thyra Aves., to Ontario Amiesite Co., Ltd., Commerce & Transportation Bldg., $93,883. Est. $100,000.

Public Bond Elections

Coming Bond Elections

Waterworks—Watsonville, Calif., $134,000.
Power Plants—Jackson, Tenn., August 1, $750,000.

Bonds Voted

Waterworks—Jefferson, La., $1,250,000.
Sewers—Claremore, Okla., $54,000.
Drainage—Herington, Kan., $49,000.
High School—Lubbock, Tex., $650,000.

Bonds Defeated

Memorial—Dubuque, Ia., $385,000.
Park—Beaumont, Tex., $275,000.

FEDERAL GOVERNMENT

Proposed Work

Mass., Boston—BREAKWATER—U. S. Engineer Office, repairing Isle of Shoals Breakwater, incl. 3,500 tons stone.

Mississippi — DREDGING — U. S. Engineer Office, Mobile, Ala., received no bids June 20, 2,500,000 cu.yd. in Gulfport Ship Channel and Anchorage Basin. Noted May 30.

N. C., Wilmington—CATAMARANS, etc.—U. S. Engineer Office, 12 catamarans, 26 pcs. 20 in. pipe.

Pa., Pittsburgh—LOCK—U. S. Engineer Office Lock 7, Allegheny River.

Wash., Anacortes—DREDGING—U. S. Engineer Office, Seattle, 150,000 cu.yd. Anacortes Harbor.

Bids Asked

Kan., Lawrence—EXTENSION—Aug. 21, by Treas. Dpt. at office Supervising Archt., Wash., D. C., extension, remodeling U. S. Post Office; adv. E. N.-R. July 25 .

Massachusetts — DREDGING — Aug. 19, by U. S. Engineer Office, Custom House, Boston, in Dorchester Bay and Neponset River; adv. E. N.-R. July 25. Noted July 18.

N. Y., Brooklyn—BUZZERS—July 30, by Signal Supply Officer, 58th St. and 1st Ave., buzzers for Radio Transmitter Signal Corps.

Pa., Sharpsburg—BOILERS, etc.—Aug. 6, by U. S. Veterans' Bureau, Arlington Bldg., Wash., D. C., remodeling existing boilers, installing 5 new boilers and connections to piping, at U. S. Veterans' Hospital, Aspinwall.

S. C., Greenville—MARQUISE, etc.—Aug. 22, by Treas. Dpt., at office Supervising Archt., Wash., D. C., new marquise, roof dormers, partitions, at U. S. Post Office and Court House; adv. E. N.-R. July 25.

Tenn., Madison—CURBING, etc.—July 27, by Constructing Quartermaster, Jeffersonville, Ind., 3,000 lin.ft. concrete combination curbing-guttering, and 3,600 sq.yd. bituminous concrete paving at Nashville Natl. Cemetery.

Tenn., Memphis — EARTHWORK — July 29, by U. S. Engineer Office, 974,000 cu.yd. earthwork in Lower St. Francis Levee Dist.

Tex., Randolph Field (mail San Antonio)—QUARTERS, etc.—Aug. 15, at office Constructing Quartermaster, 47 double non-commissioned officers quarters; five 1 story and three 2 story field officers quarters; fourteen 1 story and forty-six 2 story company officers quarters; one Quartermaster and one air corps warehouses, five 250 men air corps barracks, and one 300 men air corps barracks, all with utilities; adv. E. N.-R. July 25.

Va., Elko—HEATING PLANT—July 29, by Constructing Quartermaster Supply Officer, Wash., D. C., installing hot water heating plant, in Superintendent's Lodge, Glendale Natl. Cemetery.

Va., Fort Myer—RESURFACING, etc.—July 31, by Constructing Quartermaster, resurfacing, patching road.

Wis., Beloit—BOILER—Aug. 7, by Treas. Dpt. at office Supervising Archt., Wash., D. C., heating boiler, at U. S. Post Office.

Wyo., Sheridan—ROAD, etc.—Aug. 13, by U. S. Veterans' Bureau, Arlington Bldg., Wash., D. C., road and resurfacing at U. S. Veterans' Hospital.

Bids Received

Idaho—ROAD—Bureau Reclamation, Dpt. Interior, Boise, July 16, Deadwood Dam Payette Div., Boise Irrigation Project, from Utah Constr. Co., Ogden, $953,855. Noted June 13.

Idaho, Boise—REMODELING—Treas. Dpt., at office Supervising Archt., Wash., D. C., July 19, remodeling and constructing 4 story, basement, extension U. S. Post Office and Court House from C. Weitz Sons, 713 Mulberry St., Des Moines, Ia., $355,000. Noted June 20.

Kan., Elwood—CLUMP DIKES—U. S. Engineer Office, Postal Telegraph Bldg., Kansas City, Mo., July 8, 7,500 lin.ft. standard pile clump, dikes or current retards in Missouri River, from Woods Bros. Constr. Co., 132 South 13th St., Lincoln, Neb., $180,780 or $197,550. Noted June 20.

Nev., Fallon—APPROACH—Treas. Dpt., at office Supervising Archt., Wash., D. C., July 16, approach work at Post Office, from T. W. Cissell, Bethlehem, Pa., $4,100. Noted June 26.

N. Y., Watertown—EXTENSION, etc.—Treas. Dpt., at office Supervising Archt., Wash., D. C., extending and remodeling U. S. Post Office, from F. R. Comb, 2113 Chicago Ave., Minneapolis, Minn., $265,000. Noted June 27.

O., Cincinnati—EXTENSION—Treas. Dpt., at office Supervising Archt., Wash., D. C., July 17, extending mezzanine at Custom House and Post Office, from David Gordon Building Co., Burnet and Northern Avan Aves., Cincinnati, $14,568. Noted June 26.

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Federal Government (Continued)

Ore., Portland — ROADS — Bureau P. Rds., Dpt. Interior, widening Mt. Baker Natl. Forest Rd., from Axel, Lind & Co., Bellingham, Wash., $56,970; top course surfacing Oreille Project Natl. Forest Rd., from Materne Bros., Spokane, Wash., $17,560; grading, surfacing Tonasket-San Poil Project, from Triangle Constr. Co., 1220 Ide St., Spokane, Wash., $52,989; crushed rock surfacing Mt. Hood-Wapinitia Natl. Forest Rd. Project, from R. E. Harness, Burns, $84,416.

Contracts Awarded

Calif., San Francisco — DREDGING — U. S. Engineer Office, dredging 119,100 cu.yd. Petaluma Creek, to American Dredging Co., 255 California St., San Francisco, $49,546.

Calif., Sawtelle—BARRACKS—Natl. Home for Disabled Soldiers, 3 story barracks, to Los Angeles Contg. Co., 4816 West Pico St., Los Angeles, $971,500. Noted June 13.

D. C. Wash.—GRANITE—Executive Officer, Arlington Memorial Bridge Comn., Navy Bldg., granite facing for Bridge Plaza and approach structures at Washington end for Arlington Memorial Bridge, Contr. 31, to John Swenson Granite Co., Concord, N. H., $139,430; Contrs. 32 and 33 from North Carolina Granite Corp., Mt. Airy, N. C., $127,000 and $279,000 respectively. Grand total $545,430. Noted July 11.

D. C., Wash. — HOSPITAL — Dpt. Interior, medical, surgical, building, St. Elizabeth's Hospital, to W. P. Rose & Co., Goldsboro, N. C., $739,786; elevators, to A. B. See Elevator Co., Wash., D. C. Noted June 27.

Ga., Fort Benning—HOSPITAL, etc.—Constructing Quartermaster, hospital addition, nurses quarters, connecting corridors C and D, to H. B. Nelson Constr. Co., Augusta, $120,313. Noted June 20.

Idaho—ROAD—Bureau P. Rds., improving Ketchum-Clayton Rd., Sawtelle Natl. Forest, to Drummie Constr. Co., Downey, $52,651. Noted July 4.

Illinois — EARTH WORK — U. S. Engineers Office, Memphis, Tenn., 870,000 cu.yd. earthwork in Cairo and Reelfoot Levee Dist., Piece 2A, to J. J. McCaughey & Co., 189 West Madison St., Chicago, and States Constr. Co., 38 South Dearborn St., Chicago, $40,455; Pieces 2B, 7A and 7B, to J. H. Boyce Sons Co., Park View Hotel, Memphis, Tenn., and R. L. Igo, Omaha, Neb., $206,020; Pieces 2C, to Ward-Hayes Constr. Co., Cleveland, O., $84,000. Grand total $330,475. Noted June 13.

La., New Orleans—SPILLWAY—U. S. Engineer Office, foot Prytania St., Bonnet Carre Spillway, to Stevens Bros., 612 Endicott Bldg., St. Paul, Minn., and Miller-Hutchinson Co., Ocean Springs, Miss., $3,065,957. Noted July 18.

N. Y., Brooklyn—BOILERS—Spec. 5923—Bureau Yards & Docks, Navy Dpt., Wash., D. C., oil burning equipment for power plant, Naval Hospital, to Mechanical Eng. & Constr. Corp., 519 Mills Bldg., Wash., D. C., $38,367 (130 days). Noted June 27.

Oregon—ROAD—U. S. Bureau P. Rds., Salem, grading Roosevelt Hy., Sierslaw Natl. Forest, Coos Co., to E. McNutt, Eugene, $100,005.

Pa., Phila. — DREDGING — U. S. Engineer Office, 593,000 cu.yd. Delaware River, to G. H. Breyman & Bro., 17 Battery Pl., New York, $271,304.

Tex., Taylor—POST OFFICE—Treas. Dpt., at office Supervising Archt., Wash., D. C., post office, to Kellogg & Anderson, Des Moines, Ia., $96,380. Noted July 11.

Utah — ROAD — Bureau Reclamation, Dpt. Agriculture, Ogden, grading, crushed rock surfacing 4.15 mi. Heber-Fruitland Sect., Vinta-Natl. Forest Rd., Wasatch Co., to B. D. Palfreyman, Springville, $42,908. Noted July 4.

Canal Zone—CULVERT—Constructing Quartermaster, Albrook Field, rein.-con. culvert along Rio Corundu, Albrook Field, to R. E. Sexton, Canal Zone, $178,000.

RAILWAYS

Proposed Work

New York—New York Central R.R. Co., F. B. Freeman, ch. engr., 466 Lexington Ave., New York, granted permit 5 mi. line between Briarcliff Manor and East View, also abandoning present 6 mi. line. $1,192,000.

Bids Received

New York—G. U. Harvey, pres. Queens Boro, Queens Subway Bldg., Long Island City, July 17, relocating, tracks Queens Blvd. between Grand and Yellowstone Sts., also between Quentin St. and Hillside Ave., from Eastern Contg. Co., 375 Fulton St., Brooklyn, $57,071 and $113,768 respectively. Noted July 11.

Contracts Awarded

California—Southern Pacific Ry. Co., G. W. Boeshke, ch. engr., 65 Market St., San Francisco, grading for double-track line between Watsonville Junction and Logan Quarry, in Watsonville, to Granite Constr. Co., Watsonville, $55,000.

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POWER AND LIGHTNIG

Proposed Work

Ia., Shenandoah—Iowa-Nebraska Light & Power Co., granted 25 year franchise and expending $200,000, improvements.

N. J., Clifton—Bd. City Council, City Hall, traffic lighting system on Main Ave., from Crooks Ave. to Highland Ave. $25,000. J. L. Fitzgerald, city engr.

N. Y., Minerva—New York Power & Light Corp., subsidiary Mohawk Hudson Power Co., 126 State St., Albany, single phase primary line either from existing line at Pottersville or from substation at Chestertown through town of Minerva about 10 mi. long.

Tennessee—State Railroad and Public Utilities Comn., Nashville, granted permission to Hudson River Power Co., Rogersville, 3 power sites in East Tennessee, incl. 3 dams on Holston River, 1 dam and 3 waterpower plants at Kingsport, 1 dam at Bluff City. Noted Jan. 31.

Okla., Tahlequah—City, preliminary plans installing Diesel engine, equipment in light plant, $25,000. A. B. Thompson, mayor.

Contracts Awarded

Calif., Long Beach—Street Lighting System in 2nd St., to F. Ziebarth, 807 Farmer & Merchants Bank Bldg., $32,294. Noted July 11.

GAS

Proposed Work

Tex., San Marcos—United Gas Co., Frost Bldg., San Antonio, granted franchise natural gas distributing system, incl. 30,000 ft. pipe, $45,000.

N. Y., Sullivan—Syracuse Lighting Co., 421 South Warren St., Syracuse, extending gas facilities for light, heat and power in Chittenango and Fayetteville, here.

Contracts Awarded

Ont., Glencoe—Dominion Petroleum Co., Glencoe, drilling wells for gas and oil, to D. Laver, Tillsonburg.

TUNNELS AND SUBWAYS

Proposed Work

Calif., Long Beach—City underpass, Pacific Ave., $140,000. Pacific Electric Ry. Co., 610 South Main St., Los Angeles, will share cost. A. H. Adams, city engr.

Que., Montreal—City soon takes bids subways under Canadian Pacific R.R. tracks, at Park Ave. and Jean Talon St. $98,000. Noted Apr. 11.

Bids Asked

N. Y., Long Island City—Aug. 2, by Dpt. Transportation, J. H. Delaney, chn., 49 Lafayette St., New York, constructing Sect. 5, Route 108, Rapid Transit R.R., Queens Boro.

Tennessee—Aug. 2, by State Dept. Hys. & P. Wks., Nashville, concrete I-beam underpass, approaches to Harahan Bridge, Project 300, Shelby Co. R. H. Baker, hy. comr.

Bids Received

N. Y., Long Island City—Bd. Transportation, J. H. Delaney, chn., 49 Lafayette St., New York, July 16, reconstructing subway portals at Amity and Lawrence Sts., Queens Boro, from John H. Duncan, Inc., 5718 2nd Ave., Brooklyn, $16,179. Noted July 11.

Contracts Awarded

Pa., Phila.—Girard College, Corinthian Ave. and Girard St., 750 ft. rein.-con. tunnel, Corinthian Ave. and Girard St., to Tallman Anderson Co., 1713 Sansom St.

GRADE CROSSINGS

Proposed Work

N. Y., Cheektowaga—New York Central R.R. Co., F. B. Freeman, ch. engr., 466 Lexington Ave., New York, eliminating crossing at Harlem Ave. $248,400.

N. Y., Mineola—Long Island R. R. Co., A. C. Watson, ch. engr., Pennsylvania Station, New York, replacing present bridge with new bridge to carry Franklin Ave. (Mineola Blvd.) over railroad tracks and Front St. $50,052.

N. Y., Olean—Pennsylvania R.R. Co., T. J. Skillman, ch. engr., Broad St. Sta., Phila., Pa., and Pittsburg, Shawmut & Northern R.R. Co., W. W. Morrison, ch. engr., Kittanning, Pa., eliminating East State St. Grade Crossing, $33,460.

Contracts Awarded

N. Y., Catherine—Lehigh Valley R.R. Co., G. T. Hand, ch. engr., 143 Liberty St., New York, eliminating Montour Falls-Alpine Co. Hy. crossing, to W. Curtis Co., Geneva, $27,370.

N. Y., Cold Spring—New York Central R.R. Co., F. B. Freeman, ch. engr., 466 Lexington Ave., New York, main street crossing, to Walsh Constr. Co., Herald Bldg., Syracuse, $30,895.

DAMS

Proposed Work

B. C., Granite—West Kootenay Power & Light Co., Rossland, dam on Kootenay Lake.

Bids Received

La., St. Bernard—Police Jury St. Bernard Parish, T. W. Serpas, pres., July 2, creosoted timber dam across Bayou Terra-aux Beoufs near Bayou La Loutre from J. M. De Fraites, Inc., Canal Bank Bldg., New Orleans, Type A $1,155, Type B $575 excavating 6,000 cu.yd., from Highway Constr. Co. Ltd. Godchaux Bldg., New Orleans, $0.90 per cu.yd. Noted June 20.

AIRPORTS

Proposed Work

Mo., Bridgeton—City of St. Louis, c/o Bd. P. Serv., City Hall, St. Louis, soon takes bids rein.-con. apron for Lambert-St. Louis Flying Field, $85,000; also brick, rein.-con. comfort station, $9,500.

Tex., Ft. Worth—T. A. T. Flying Service, Inc., c/o A. P. Barrett, Ft. Worth Natl. Bank Bldg., airport, incl. dormitories, mess halls, administration building, two 100 x 200 ft. brick, tile, steel hangars, 6½ mi. north on Wichita Falls Hy.

Bids Asked

N. J., Newark—July 31, by Institutions & Agencies, hangar at airport, $60,000. C. N. Leathem, State Bldg., archt.

Que., St. Hubert—Aug. 2, by S. E. O'Brien, secy. Dpt. P. Wks., Ottawa, Ont., constructing Airplane Hangar 3, complete except for structural steel, heating, electricity, Montreal Air Harbor.

Bids Received

Mich., Detroit—Dpt. P. Wks., brick, steel, concrete airplane hangar at city airport, from Corrick Bros., 507 Owen Bldg., $529,750.

Tenn., Chattanooga — Office Pub. Utilities, clearing, grading, sub-soiling, soil treatment, fertilizing, turfing, 100 x 120 ft. field for airport, from Brown Constr. Co., Chattanooga, $117,000. Noted June 20.

Contracts Awarded

Ala., Gadsden—Goodyear Tire & Rubber Co., East Market St., Akron, O., 80 x 200 ft. hangar 40 ft. high, to A. K. Adams & Co., 542 Plum St. N. W., $50,000.

Idaho, Boise—Grading, hangars, drainage, to Ryberg McHugh & Crowley, Boise, $69,970. Noted Mar. 28.

O., Akron—Akron Air Services, Inc., G. W. Merz, pres., 975 East Market St., 1 story, 80 x 144 ft., brick, rein.-con. airplane hangar, at Fulton Field, to Clemmer & Noah, 470 East Market St. Est. $75,000.

Pa., Dravosburg—Curtis Airports Corp., c/o K. Franzheim, archt., Madison Ave., New York, developing Bettis Field, to Stone & Webster Eng. Corp., 120 Bway., New York. Noted July 11.

Pa., Pittsburgh—H. G. Woodside, controller Allegheny Co., Court House, grading, draining municipal and county airport, Lebanon Rd., near here, Mifflin Twp., to Vang Constr. Co., Bessemer Bldg., $1,470,379. Noted July 11.

PIPE LINES

Proposed Work

Texas and Illinois—Texas Co. et al. 720 San Jacinto St., Houston, Tex., and 17 Battery Pl., New York (incl. Skelly Co., Phillips Petroleum Co., and Columbian Carbon Co., 45 East 42nd St., New York), gas pipe line from Texas Panhandle section to Chicago, Ill., via Oklahoma, Kansas, Missouri and Iowa. $15,000,000. Private plans.

SPORTS AND PARKS

Proposed Work

Colo., Pueblo—W. E. Esplin & D. A. Zook, 400 West 5th St., natatorium, gymnasium, 9th St. and Santa Fe Ave. $90,000. C. E. Thomas, 315 1st Natl. Bank Bldg., archt.

Del., Wilmington — Park Bd. 2 swimming pools, 1 at Delamore Park, $80,000, and other at 14th and Poplar Sts., $40,000.

Mass., Hyde Park—City of Boston, Park Dpt., 33 Beacon St., Boston, golf course, probably in Grew's Woods, $225,000 voted.

Sports and Parks (Continued)

N. J., Jersey City—Hudson Co. Park Comn., 921 Bergen Ave., rein.-con. outdoor swimming pool, on Suckley Estate, North St. $75,000.

N. J., Nutley — Town Comrs., Town Hall, rein.-con., glazed brick swimming pool, $40,000. Engineer not selected.

N. J., Ridgefield Park—Township Comrs., 232 Main St., rein.-con. swimming pool in Veterans Park, $25,000. D. C. Boswell, 6 Mt. Vernon St., engr.

N. Y., Long Island City—Henderson Stadium, Inc., 25 Beaver St., New York, soon takes bids general contract 570 x 692 ft., brick, timber reviewing stand, North James St. and Van Alst Ave. $700,000. D. Campbell, 154 Amity St., Flushing, archt. Noted June 20.

N. Y., Utica—Bd. Contrs. & Supply, North Utica Playground, Rutgers St. $30,000.

Ont., Kitchener—City, 125 x 200 ft. concrete swimming pool, bath houses. $25,000-$30,000. S. Shupe, City Hall, engr.

Bids Asked

N. J., Hackensack—July 26, by Bd. Parks & Playgrounds, Municipal Bldg., rein.-con. wading pool, and 1 story, brick comfort station on city park property. $75,000. B. S. Newman, 173 Main St., engr.

N. J., Perth Amboy—Bd. City Comrs., City Hall, bids about Aug. 1, general contract rein.-con., steel stadium at City Park between Eagle and Myrtle Sts. $80,000. L. P. Booz, Jr., 283 Madison Ave., engr. Noted May 5.

Wis., Manitowoc—July 29, by Hamilton Fellows & Neved, archts., 814 Tower Ct., Chicago, Ill., 1 story, 72 x 117 ft., rein.-con., brick natatorium, South 8th St., for Bd. Educ. Noted July 4.

Contracts Awarded

Calif., Palo Alto—Stanford University, swimming pool, to G. Miner, Bank of Palo Alto Bldg., $100,000. Noted July 18.

N. Y., Long Island City — Park Bd., W. R. Herrick, pres. Dpt. City Parks, Arsenal Bldg., Central Park, New York, improving mall spaces in 25th Ave., Astoria, to Gottlieb Iron Wks., 444 West 38th St., New York, $10,393; restoring park areas, Forest Park Golf House, to P. K. Kelly Contg. Corp., $4,801; improving Upland Park, to W. S. Hill & Son, $8,582. Grand total $23,776. Noted July 4.

Okla., Ponca City—L. H. Wentz, swimming pool at boys camp, to Robertson Constr. Co., Tulsa, $63,000. Est. $65,000. Noted June 2.

Vt., Richford—Richford Holding Co., Park Sq. Bldg., Boston, Mass., improving golf course, golf clubhouse, garage, out buildings, to Stanley-Thompson & Co., Ltd., 57 Queen St., West Toronto, Ont.

EXCAVATION, DRAINAGE, IRRIGATION, LEVEES, RIVER AND HARBOR

Proposed Work

Mich., Detroit—City, 600 ft. rein.-con. seawall, 12 ft. wide, 10 ft. high in Memorial Park. $35,000. P. A. Fellows, City Hall, engr.

Tex., Edinburg—Hidalgo Co. Irrigation Dist. 8, McAllen, forming district to irrigate 48,000 acres, incl. 18,000 acres now watered by United Irrigation Co. $400,000 election soon for same. Address P. Devine, McAllen, engr.

Tex., Texarkana—City, c/o S. C. Nancarrow, mayor, preliminary surveys drainage system through east and south portions town, for Nix's Creek. $135,000. J. W. Dawson, Texarkana, engr. for Arkansas side.

Bids Asked

Ill., Decatur—July 27, by N. E. Decatur Drainage District, at residence H. L. Kent, 2800 Block E. Harrison St., R.F.D. 2, 45,201 ft. 6- to 27-in. rein.-con. tile, 143 cu.yd. open ditch work, 12 catch basins. S. D. Ferris, Decatur, engr.

Kan., Kiowa—Driftwood Creek Drainage Dist. bids about Sept. 15, excavating 67,000 cu.yd. drainage canal, laterals. C. H. Guernsey, Cherokee, Okla., engr.

La., New Orleans—July 30, by Bd. Levee Comrs., Court Bldg., test borings at Lake Pontchartrain end of New Basin Canal and Bayou St. John.

New Jersey—Aug. 12, at office Bd. Commerce & Navigation, State House, Trenton, dredging 1,475 channel, constructing 300 ft. jetty mouth of Double Creek, Union Twp., Contr. 45, dredging 1,100 ft. in Oyster Creek and Barnegat Bay, Ocean and Lacy Twps., Contr. 46, both Ocean Co.; 2,400 lin.ft. jetty in Broad Thoroughfare, Harbor Twp., Contr. 48, and redredging 143, 471 cu.yd. Inland Waterway channel from Atlantic City through Great Bay to Grassy Channel, near New Inlet, Atlantic City, Contr. 47, both Atlantic Co. V. YGelineau, dir. and ch. engr.; adv. E. N.-R. July 25.

Okla., Burlington — Aug. 15, by C. H. Guernsey, drainage work incl. 133,000 cu.yd. excav., for Burling D. D. 1 ,Alfalfa Co. $25,000.

B. C., Campbell River—July 31, by S. E. O'Brien, secy. Dpt. P. Wks., Ottawa, Ont., pile breakwater and float, Comox-Alberni Dist.

B. C., Victoria—Aug. 6.—S. E. O'Brien, secy. P. Wks., Ottawa, Ont., raised parapet walls at ends Ogden Point Piers; dolphins and floating fender logs at Ogden Point Piers.

Ont., Chippewa—Aug. 1, by Ross & Scott, engrs., 89 Main St. E., Welland, constructing 45,040 cu.yd. drainage system, open earth cut, for Willoughby Twp. $25,000.

Que., St. Gregoire de Montmorency—July 31, by S. E. O'Brien, secy. Dpt. P. Wks., Ottawa, Ont., revetment wall.

Contracts Awarded

Mass., Boston—Dpt. P. Wks., dredging 270,000 cu.yd. (scow measurement), Savin Hill and Dorchester Bays, to Trimount Dredging Co., 10 State St., $113,418. Noted July 4.

N. Y., Brooklyn—Bd. Educ., 500 Park Ave., New York, culvert fill adjoining Abraham Lincoln High School, Ocean Parkway and Guider Ave., to Reiss Constr. Co., 179 Linden Blvd., $35,764. Noted June 27.

Mo., Princeton—Commissioners, West Medicine Drainage Dist., c/o A. L. Rhodes, secy., 13 brush dams, 290,000 cu.yd. excav., six 80 x 14 ft. steel, and three 43 x 8 ft. piling bridges, to Briggs & Drew, 926 City Natl. Bank Bldg., Omaha, Neb.

Tex., San Benito—Al. F. Parker Securities Co., irrigating 50 acres, incl. 14,000 lin.ft. 8 in. pipe, to Agar & Gentry, San Benito, $25,000.

TANKS

Bids Asked

Mass., Westfield—July 26, by Dpt. P. Health, State House, Boston, 100,000 gal. flat-bottomed steel suction tank with necessary heating equipment, and found., incl. brass heating, coil, and pipe connections at State Sanatorium.

Contracts Awarded

Ill., Chicago—Peoples Gas & Light Co., 122 South Michigan Ave., masonry contract steel gas tank 123 ft. diam., 11012 Torrence St., to Bartlett Howard Co., 14981 Riverwood Ave., Baltimore, Md., $123,000.

ELEVATORS

Bids Asked

N. Y., New York—July 30, by W. C. Martin, supt. school buildings, Flatbush Avenue extension and Concord St., Brooklyn, electric passenger elevators, platform hoist in Evander Childs High School, Gun Hill Rd.; Magenta St., Bronxwood and Barnes Aves., for Bd. Educ., 500 Park Ave.

Pa., Phila.—July 30, by Dpt. City Transit, C. E. Myers, dir., City Hall Annex, passenger and escalator well, City Hall Station, Contr. 179. Former bids rejected. Noted July 4.

Contracts Awarded

Pa., Phila.—Dpt. City Transit, C. E. Myers, dir., City Hall Annex, Escalator No. 1, complete for City Hall Sta., Contr. 189, to Otis Elevator Co., 502 North 19th St., $49,672. Noted July 4.

Pa., Pittsburgh—Pennsylvania R.R. Co., T. J. Skillman, ch. engr., Broad Street Station, Phila., changing elevators in Union Station, to W. F. Trimble & Sons Co., 1719 Penn Ave. N. S.

HEATING AND VENTILATING

Bids Asked

Ind., Indianapolis—Aug. 20, at office Trustee Indiana World War Memorial, Indiana World War Memorial Bldg., St. Clair and Meridian Sts., temporary heating equipment in main structure designated as Building A of Indiana World War Memorial. Walker & Weeks, 2341 Carnegie Ave., Cleveland, O., archts.

N. Y., New York—Aug. 8, by W. C. Martin, supt. school buildings, Flatbush Avenue extension and Concord St., Brooklyn, heating, ventilating, plumbing, drainage, electrical work for Textile High School, West 18th St., for Bd. Educ., 500 Park Ave.

Bids Received

N. Y., Buffalo—Comrs. Dpt. Mental Hygiene, Capitol, Albany, July 17, heating reception building, Buffalo State Hospital, from W. W. Wetmore Corp., 259 Delaware Ave., $17,949; electrical work, from O'Connell Electric Co., 63 Mt. Hope Ave., Rochester, $49,975. Noted July 4 under "Unclassified."

Contracts Awarded

N. Y., Central Islip — Dpt. Mental Hygiene, Capitol, Albany, heating service connections Central Islip State Hospital, to R. N. Baker, 101 Park Ave., New York, $27,400; electrical work, to Erickson Eng. Co., 452 Lexington Ave., New York, $5,938. Noted June 6.

N. Y., Hudson — Superintendent Div. Standards & Purchase, Albany, heating for New York State Training School for Girls, to H. Sand & Co., 138 Bway., New York, $15,425; electrical work, to Erickson Eng. Co., 452 Lexington Ave., New York, $3,945. Noted June 13.

N. Y., Napanoch—Dpt. Correction, Albany, heating, to Gillis & Geohegan, 537 West Bway., New York, $12,570; tunnels, to C. N. McLean, 332 Water St., Binghamton, $5,800; electrical work, to W. H. Straut Co., Haverstraw, $3,920. Grand total $22,290. Noted June 13.

UNCLASSIFIED

Proposed Work

BY-PASS LINE — **Sacramento, Calif.** — City soon takes bids 60 in. steel by-pass line in filter beds at water filtration plant. $25,000. B. C. Clark, city engr.

TELEPHONE LINE — **Colorado** — Mountain States Telephone & Telegraph Co., 800 14th St., Denver, 60 mi. telephone line from Salida to Canon City. $100,000.

BULKHEAD, etc. — **New Bedford, Mass.** — Hathaway Oil Co., 15-17 North 6th St., bulkhead, solid fill, piling, repairing present wharf. $25,000. Private plans.

RESORT—**Mississippi**—Owner, c/o Allen, Cannon & Urling, archts., 1924 Bway., Oakland, Calif., sketches group resort buildings, incl. hotel, amusement buildings. $2,000,000.

UNDERPASS—**San Antonio, Tex.**—Rexar Co. and Missouri, Kansas, Texas Ry. of Texas, F. Ringer, ch. engr., Dallas, 180 ft. rein.-con. underpass, on Hy. 2, San Antonio-Austin Rd. $76,000. G. Gilchrist, Austin, state hy. engr. G. Collins, San Antonio, co. engr.

DOCKS—**Sandwich, Ont.**—Pittsburg Coal Co., B. Gatfield, mgr., timber, concrete addition to coaling dock. $250,000. Noted Mar. 21.

Bids Asked

PIER—**Oakland, Calif.**—Aug. 5, by City Port Comn., substructure 1,500 ft. rein.-con. pier, 224 ft. wide, 9th Ave.

CABLE LINE —**Missouri** — See "Contracts Awarded."

WALL—**Auburn, N. Y.**—Aug. 13, at office Dpt. Correction, Home Savings Bank Bldg., 11 North Pearl St., Albany, wall at Auburn Prison; adv. E. N.-R. July 25.

FIRE ALARM SYSTEM—**Long Island City, N. Y.**—July 30, by J. J. Dorman, comr. Fire Dpt., Municipal Bldg., New York, underground fire alarm system, Merrick Rd. and New York Avenue Impvts.

MOTORS and CONTROL EQUIPMENT—**New York, N. Y.**—Aug. 20, by Bd. Transportation, J. H. Delaney, chn., 49 Lafayette St., motors and control equipment, power equipment, for Independent System of City Subways.

PUMPS, etc.—**New York, N. Y.**—Aug. 2, by Bd. Transportation, J. H. Delaney, chn., 49 Lafayette St., pumping equipment at Chambers and Church Sts., Church and Franklin Sts., Canal St. and 6th Avenue Extension, Minetta St. and 6th Avenue Extension, West 11th St. and Greenwich Ave.; also railroad duct line Route 104.

STEEL PASSENGER CARS—**New York, N. Y.**—Aug. 20, by Bd. Transportation, J. H. Delaney, chn., 49 Lafayette St., 300 steel passenger cars, for Independent System of City Subways; adv. E. N.-R. July 25.

STREET FLUSHER—**Amarillo, Tex.**—July 30, by City Com., one 750 gal. or one 1,000 gal. power street flusher, W. N. Durham, city mgr.; adv. E. N.-R. July 25.

AUTOMATIC BLOCK SIGNALING and INTERLOCKING—**Phila., Pa.**—July 30, by Dpt. City Transit, C. E. Myers, dir., City Hall Annex, 5.3 mi. automatic block signaling and interlocking system, Broad Street Subway between South St. and point north of Girard Ave., Contr. 225.

Bids Received

DOCK — **Tacoma, Wash.** — Bd. Contracts & Awards, repairing municipal dock, from O. F. Larson, California Bldg. Est. $97,000.

Contracts Awarded

UNDERPASS—**Enterprise, Ala.**—See "Streets and Roads under Alabama."

CULVERTS—**Newton, Ia.**—Jasper Co., 8 box culverts, to H. C. Macey, Lynnville, $1,500; 7 to Schroyer Constr. Co., Baxter, $2,698; 12 to F. E. Stoops, Ames, $4,689; 11 to J. D. Palmer, Kellogg, $4,516; 3 pipe culverts to Wilson Constr. Co., Red Oak, $411 Grand total $13,814.

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Unclassified (Continued)

CABLE LINE—**Missouri—Southwestern Bell Telephone Co.**, 11th and Pine Sts., St. Louis, 260 mi. underground conduit between St. Louis and Kansas City, incl. ditch 18 in. wide, 3 to 6 ft. deep, 4 amplifying stations, 150,000 mi. wire, 1,750 manholes, own forces. $7,000,000. Private plans.

GRAIN ELEVATOR—**St. Louis, Mo.**—Chicago, Burlington & Quincy R.R. Co., 547 West Jackson Blvd., Chicago, Ill., 200 ft. high, 83 x 100 ft. grain elevator, rein.-con., 1,250,000 cu. yd. capacity, to James Stewart Corp., 343 South Dearborn St., Chicago, Ill. Est. $500,000. Noted June 6.

BOILERS, STOKERS, ETC.—**Lincoln, Neb.**—State University, three 800 hp. boilers, to Murray Iron Wks., Burlington, Ia., $60,735; stokers, to Westinghouse Electric & Mfg. Co., Lang St. and Pennsylvania R.R., Pittsburgh, Pa., $22,433; switchboard, to Westinghouse Electric & Mfg. Co., 150 Bway, New York, $5,127; turbines, to General Electric Co., Schenectady, N. Y., $54,612; condensers, to Worthington Pump & Mchy. Corp., 105 Cedar St., New York, $17,226; coal handling equipment, to R. H. Beaumont Co., Phila., Pa. $23,700; cooling system, to Standard Power Equipment Co., Ry. Exch. Bldg., St. Louis, Mo. $10,600; heating mains, to T. F. Pearce Co., Glen Ellyn, Ill. $102,681. Grand total $297,114. Noted June 27.

SHORE PROTECTION — **Cleveland, O.** — Rubble stone and brush mat shore protection along Lake Erie, at Gordon Park, to L. R. Wells Constr. Co., 30 Euclid Arcade, $33,948. Noted July 11.

GRAIN ELEVATOR—**Port Huron, Ont.**—North American Elevator Co., 1,000,000 bu. grain elevator, rein.-con., and handling equipment, to McDonald Eng. Co., C. P. R. Bldg., Toronto. Est. $500,000.

ICE BREAKER and FIRE TUG — **Toronto, Ont.**—Toronto Harbor Comrs., ice breaker and fire tug, steel, 100 ft. long, B. P. 25 ft. beam, to Collingwood Shipyards Ltd., Royal Bank Bldg. Contractor taking bids on equipment, incl. 15½, 26 and 44 cylinder triple expansion engines, Scotch type oil burning boiler, 15 ft. diam., 11 ft. long, fire pumps, hydrants, hose connections.

FIRE and POLICE ALARM SYSTEM — **Que. Montreal**—City, new fire and police alarm systems, to Northern Electric Co., 121 Shearer St., $41,150.

MATERIALS

Bids Asked

CYPRESS LUMBER—**Jacksonville, Fla.**—July 29, by City Comm., G. M. Gordon, purch. agt., City Hall, 300,000 ft. cypress lumber.

COPPER WIRE—**Jacksonville, Fla.**—Aug. 5, by City Comrs., City Hall, 73,000 lb. 500,000 C.M. thirty-seven strand medium hard drawn bare copper wire, f.o.b. Jacksonville.

SNOW FENCE, etc.—**Mason City, Ia.**—July 29, at office Auditor Cerro Gordo Co., 34,000 ft. snow fence, two thousand two hundred 6½ ft. steel posts.

GRANITE BLOCKS, PAVING SAND, etc. — **New York, N. Y.**—July 31, by J. Miller, pres. Manhattan Boro, Municipal Bldg., 50,000 special 5 in. granite blocks, 3,000 cu.yd. concrete paving sand, 15,000 cu.yd. asphalt sand, 600 tons asphaltic joint filler.

LAMPPOST CASTINGS—**New York, N. Y.**—Aug. 1, by P. J. Dooling, comr. Purchase, Municipal Bldg., lamppost castings for Dpt. Water Supply, Gas & Electricity.

STRUCTURAL STEEL—**Phila., Pa.**—July 29, by C. E. Walsh, purch. agt. Pennsylvania R.R. Co., 15 North 32nd St., structural steel, Contr. 35-1929.

FOREIGN

Chili, Santiago—Republic of Chili, government buildings at Santiago, to Fred T. Ley Co., 578 Madison Ave., New York. Est. $1,000,000.

Mexico—Mexican Government, Highway Dpt., Mexico City, asphalt on gravel paving 145 mi. New Laredo-Monterey Rd., 20 ft. $600,000.

Industrial—Buildings

FACTORIES AND MILLS

Proposed Work

Calif., Emeryville — Marchant Calculating Machine Co. plans by Miller & Warnecke, 1404 Franklin St., Oakland, 2 story, concrete factory, Powell St. $50,000.

Calif., Oakland—Boeing Air Transport Co., Inc., Balboa Bldg., San Francisco, steel airplane factory, adjoining Municipal Airport. To exceed $150,000. Austin Co. of California, Russ Bldg., engrs.

Colo., Thatcher—A. Rosebush, Columbia Hotel, factory for manufacturing helium gas.

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Conn., Bridgeport—Bassick Co., 33 Austin St., brick, steel factory. To exceed $40,000. Engineer and architect not selected.

Ill., Rockford—Lockwood, Greene & Co., 400 North Michigan Ave., Chicago., soon lets contract 1 story, 85 x 274 ft. factory with 60 x 70 ft. addition, for Rockford Drop Forge Co., $150,000.

Ill., Streator—Anthony Co., 1 story, 60 x 300 ft., brick factory, F. A. Randall, 222 North Wells St., Chicago, engr.

Mass., Chelsea (br. Boston)—Inter-Continental Pape & Mining Co., H. Kennedy, pres., 475 5th Ave., New York, manufacturing building, incl. wharf, dredging, Eastern Ave. $3,000,000. Fay, Spofford & Thorndike, 44 School St., Boston, engrs. Noted May 16.

Mass., Everett — Henry T. Ripley, Inc., 80 Boylston St., Boston, plans 1 story, brick, steel, factory, incl. offices concrete foundations, Factory St. $40,000 or more. Private plans.

N. J., Bayonne—I. Shapiro, 311 35th St., North Bergen, plans by M. Kraut, 3010 Hudson Blvd., Jersey City, 2 story, basement, 70 x 135 ft., brick, steel, rein.-con. factory, plain foundations, 23 West 25th St. $50,000.

N. J., North Arlington—W. H. Rademaekers, 74 Oraton St., Newark, will not build 1 story, basement, brick, steel factory, plain found, Belmont Ave. and River Rd. $40,000. Project abandoned. Noted July 4.

N. J., Phillipsburg—Cameron Pump Wks. soon lets contract manufacturing plant addition, equipment. $250,000.

N. Y., New York—A. B. Campbell Carpet Cleaning Co., 612 East 15th St., soon takes bids general contract altering and constructing 2 story factory addition. Lockwood, Greene Engineers, Inc., 100 East 42nd St., engrs. and archts. Noted Apr. 18.

O., Cleveland—Buckeye Ribbon & Carbon Co., M. F. Donovan, pres., 1450 East 55th St., sketches by P. Matzinger, 1227 Prospect Ave., 1 story, 50 x 140 ft., brick, steel factory addition. $50,000. Noted July 4.

O., Cleveland — Richman Bros. Co., C. L. Richman, pres., 1600 East 55th St., plans by Christian, Schwarzenberg & Gaede Co., 1836 Euclid Ave., 5 story, basement, 65 x 213 ft., brick, rein.-con. factory, East 55th St. and Luther Ave. $350,000.

O., Cleveland — Spaulding Fibre Co., G. E. Calhoun, mgr., 124 St. Clair Ave., plans by McGarry & McGarry, 241 Euclid Ave., 1 story, 100 x 100 ft., brick, steel factory and office, Hamilton Ave. $35,000.

Ore., Portland—Jantzen Knitting Mill Co., 695 Sandy St., J. R. Davidson, treas., Portland, soon takes bids 1 story mill, incl. machinery, Hoyt, East 19th and East 20th Sts. $60,000-$75,000.

Pa., Lebanon—New Bedford Silk Mills, c/o E. C. Epple, archt., 44 Commerce St., Newark, N. J., soon lets contract 1 story, basement silk mill, rein.-con., brick, plain found. $50,000.

Tex., San Antonio—Guggenheim Interests, c/o Chamber of Commerce, plans airplane factory in Harlandale, near here. $259,999.

B. C., Vancouver—W. E. Boeing, Hoge Bldg., Seattle, Wash., H. S. Hoffar, and C. G. Beeching, Vancouver, converting Hoffar-Beeching Shipyards, into airplane factory, also erecting new building, 30,000 sq.ft. floor space.

Ont., Simcoe—American Can Co., W. E. Taylor, genl. mgr., factory, Norfolk St. $500,000. W. Preis, c/o owners, engrs.

Bids Asked

Ont., Toronto—P. Hermant, 21 Wilton Sq., factory and office building, Wilton Sq. and Victoria St. Est. $225,000.

Mass., Everett (br. Boston)—American Bituminous Co., Statler Bldg., Boston, M. Schulemberg, in charge, taking bids 1 and 2 story, various sized, concrete, timber manufacturing building, plain found. $40,000. Private plans.

N. J., Newark—E. C. Epple, assoc. archt., 44 Commerce St., taking bids general contract 3 story, basement, 200 x 206 ft., brick, rein.-con. factory and showroom, Central Ave. from 16th to 17th Sts., for Packard Motor Car Co., Bway. and 61st St., New York. A. Kahn, 1000 Marquette Bldg., Detroit, Mich., archt. $300,000. Noted July 18.

N. Y., Flushing—See "Contracts Awarded."

Pa., Phila.—J. D. Weiss, archt., 119 West 57th St., New York, taking bids general contract 4 story, basement, 100 x 170 ft., brick, steel factory, 68th and Greenway Sts., for American Cigar Co., 1111 5th Ave., New York. To exceed $150,000.

Contracts Awarded

Ark., Texarkana — Southwestern Transportation Co., c/o D. W. Russell, genl. mgr., 915 Rector Bldg., Little Rock, 142 x 183 ft., concrete, brick general repair shop, 80 x 152 ft. wash rack, locker, sheet iron, to Bailey, Burns & Fitzpatrick, Merchants Bank Bldg., Dallas, Tex., $82,000. Noted July 4.

Calif., Berkeley — Calif. Corrugated Culvert Co., 5th and Parker Sts., 1 story, steel corrugated iron factory addition, to Pacific Coast Eng. Co., foot of 14th St., $40,000.

Calif., Los Angeles—Calif. Stucco Products Co., 2 story, basement, 138 x 147 ft., stucco, tile, steel, factoy, to Austin Co. of California, 777 East Washington St. $100,000.

Conn., East Hartford (br. Hartford)—Pratt & Whitney Aircraft Co., 450 Capitol Ave., Hartford, foundation for 2 story, 400 x 1,500 ft. airplane factory, to R. S. Bent Co., Edward St., Hartford. Total est. $2,000,000. Noted June 6.

Conn., Stamford — Yale & Towne Mfg. Co., 200 Henry St., 1 story, brick, concrete foundry, Canal and Market Sts., separate contracts. $55,000. Private plans.

Ill., Chicago — A. Dippold, archt., 3948 Cottage Grove Ave., masonry contract 1 story, 116 x 125 ft., brick factory addition, 944-54 West Zinzie St., to Rune & Son, 6753 Stoney Island Ave., for W. H. Salisbury Co., 401 North Morgan St. Est. $125,000.

Ill., Chicago—A. Epstein, archt., 2001 West Pershing Ave., masonry contract 1 and 2 story, 170 x 322 ft., brick factory, to Anderson & Windblad, 6235 Michigan Ave.; carpentry, to Heidel & Beck, 6235 Michigan Ave., for Western Screw Mfg. Co., 4413 West Kedzie St. Est. $100,000. Noted June 20.

Ill., Chicago — J. B. Fischer, 140 South Dearborn St., masonry and carpentry contract 4 story, 70 x 124 ft., brick factory addition, to Kritzer Constr. Co., 515 West 35th St., for Chicago Screw Co., 1026 South Homan Ave. Est. $100,000. Noted Apr. 25.

Ill., Chicago—Western Electric Co., Hawthorne Station, masonry and carpentry contract, 1 story, 91 x 120 ft., brick factory addition, 4501-59 West 22nd St., to Turner Constr. Co., 228 North La Salle St., $65,000.

Ill., Kewanee—Kewanee Mfg. Co., general contract 1 story, 122 x 200 ft., concrete, brick, steel factory, to Miller Bros., Kewanee. Est. $50,000. Noted June 13.

Mass., Worcester—Heald Machine Co., 10 Bond St., 1 story, 105 x 360 ft., brick, steel, factory, plain found., to E. J. Cross Co., 82 Foster St.

Mass., Worcester—Norton Co., 1 story, 85 x 150 ft. brick, steel, factory, plain found., West Boylston St., to E. J. Cross Co., 82 Foster St.

Mass., Worcester—Peck Shoe Co., altering and constructing factory, brick, steel addition, plain found., Winona and Nebraska Sts., to E. J. Cross Co., 82 Foster St.

Mich., Detroit—Bohn Aluminum & Brass Co., Jos. Campau Ave., 3 story, brick, rein.-con. airplane parts factory, plain found., Jos. Campau Ave., to Krieghoff Co., 6661 French Rd. Est. $130,000.

Mo., Kansas City—Beacon Airway of America, Bd. Trade Bldg., brick, steel airplane factory, to J. F. Gier, 410 East 54th St. Est. $90,000.

N. J., Elizabeth—Esperanza Trading Corp., 208 Broad St., general contract 2 story, basement, brick, steel factory, plain found., Bayway and Central R.R., to Morrison & Sherman, Inc., 223 Grove St. Est. $40,000.

N. Y., Flushing—H. C. Bohack Co., 3 story, 41 x 69 ft., factory, day labor and separate contracts. $60,000. Koch & Wagner, 32 Court St., Brooklyn, archts. Noted June 20.

O., Cleveland—Bender Body Co., H. Bender, pres., 6401 Barberton Ave., 1 story, 99 x 144 ft., brick, steel, addition, to H. G. Slatmyer & Son Constr. Co., 213 Lakeside Ave. Est. $40,000.

O., Cleveland—Gravity Carburetor Co., 3062 East 93rd St., 1 story, 40 x 100 ft., brick, steel addition, to J. L. Hunting Co., Guarantee Title Bldg. Est. $40,000.

O., East Liverpool—Patterson Steel Products Co., general contract 1 story, 100 x 180 ft., brick, steel to Potters Lumber Co., East Liverpool, $150,000, structural steel, to Hines Steel Co., Canton, O.

Okla., Oklahoma City—Preste-O-Lite Co., Inc., 30 East 42nd St., New York, 1 story, 60 x 131 x 159 ft., brick factory, plain found., Agnew St., to C. E. Huffman, 512 North Hudson St., $125,000. Noted Dec. 6.

Pa., Monaca—Pittsburgh Tube Co., general contract 2 additions, to Pittsburgh Bridge & Iron Co., Rochester. Est. $500,000.

Pa., Phila.—Hess-Bright Mfg. Co., Front and Erie Sts., 1 story, 60 x 140 ft. and 2 story, 60 x 182 ft., brick, steel, factory, plain found., Front and Erie Sts., to F. V. Warren Co., 1913 Arch St. Est. $100,000.

Pa., Phila.—E. B. Hubsobman & Sons, Oriana and Willow Sts., 2 story factory, Oriana and Willow Sts., to Monaghan & Losse, 30161 Chestnut St. Est. exceeds $40,000.

Wis., Milwaukee—Milwaukee Electric Ry. & Light Co., 217 Michigan St., 1 story, 100 x 200 ft., brick, steel repair shop addition, Cold Spring Ave., to Worden-Allen Co., Pt. Washington Rd.

Wis., Milwaukee—Nordberg Mfg. Co., Chicago and Oklahoma Sts., 1 story, 92 x 136 ft. erection shop, brick, steel, Oklahoma St., to Meredith Bros., 253 Washington St.

Wis., Waukesha—Quality Alum Coating Co., general contract 1 and 2 story, 88 x 105 ft., brick, concrete factory addition, to C. A. Dailey & Son, 732 North Grand Ave.; carpentry, to P. F. Gierke, 816 Lincoln Ave.; masonry, to G. Ward & Son, 334 Maple Ave.

POWER PLANTS

Proposed Work

Neb., Fairbury—City plans improving power plant. Burns & McDonnell, 401 Interstate Bldg., Kansas City, Mo., engrs.

Neb., Wahoo — City soon takes bids improving light plant, incl. 500 kw. turbine, condenser, 500 kw. oil engine. Burns & McDonnell, 401 Interstate Bldg., Kansas City, Mo., engrs.

Power Plants (Continued)

Ont., Toronto—Hydro-Electric Power Comn. of Ontario, 225 Yonge St., new power plants on Madawaska and Mississippi Rivers in upper Ottawa Valley. F. A. Gaby, engr.

Bids Asked

N. J., Jersey City—July 31, by P. Simeone & Co., Inc., engrs. and archts., 22 Journal Sq., 1 story, 85 x 100 ft., 60 ft. high, brick, steel power house, incl. boiler room, tunnel, plain found., Liberty Ave., for Brunswick Laundry, 222 Tonnele Ave. $160,000. Noted July 11.

Contracts Awarded

N. J., Passaic—W. Wilheim Co., Inc., 51 1st St., altering 1 story, brick, steel, plain found., 51 1st St., separate contracts. $40,000. Private plans.

N. Y., Utica—Skenandoa Rayon Corp., steam power plant, to Aberthaw Constr. Co., 80 Federal St., Boston, Mass. To exceed $500,000.

GARAGES

Proposed Work

Ky., Louisville—Realty Enterprises, Marion E. Taylor Bldg., 3 story, basement, 764 x 230 ft., 2nd and Main Sts. $100,000. Engineer and architect not selected.

Mass., Needham — Buick Garage & Service Station, Chestnut St., 1 story, 100 x 100 ft., brick, steel, concrete service garage and repair shop, plain found., Chestnut St. To exceed $40,000.

N. Y., Brooklyn—M. Altman, 350 Stone Ave., plans by Kavy & Kavovitt, 350 Stone Ave., 86 x 402 ft., brick, Elton St. and New Lots Ave. $65,000.

N. Y., Brooklyn—J. A. Flanagan, 672 72nd St., plans by F. H. Klie, 250 Park Ave., New York, 2 story, 100 x 100 ft. service garage, 73rd St. and West 7th Ave. $75,000.

N. Y., New York—Ben Kay Amusement Co., B. K. Bimberg, pres., 306 West 52nd St., bids in September or October, general contract 6 story brick, $125,900. I. Kudroff, 15 West 38th St., archt. Noted June 13.

N. Y., New York—Ninety-Fourth Street Holding Corp., 1619 52nd St., Brooklyn, plans by W. Shary, 22 East 17th St., 4 story, concrete, 312 East 94th St. $125,000.

Contracts Awarded

Mass., Cambridge—Scully Trust, 238 Main St., 2 story, 90 x 135 ft., and 40 x 95 ft. ell, brick, steel garage and shop addition, 88 1st St., plain found., 88 1st St., to Scully Co., 238 Main St.

Mich., Detroit—Greyhound Lines, Inc., Tuller Hotel, 1 story, part basement, 115 x 370 ft. brick, steel, rein.-con., Fort St. to Holton Seelye & Co., 140 South Dearborn St., Chicago, Ill. Est. $125,000.

Pa., Pittsburgh—D. Navarro, Broad St., 1 story, rein.-con. garage, 25,000 sq.ft. floor space, 36th and Liberty Sts., to Navarro Contg. Co., Broad St. Est. $45,000.

SHOPS AND FOUNDRIES

Bids Asked

N. Y., New York—Third Avenue R.R. Co., 2396 3rd Ave., bids about Aug. 1, general contract bus repair shop and paint shop, West Farms Rd., 172nd and 173rd Sts. $40,000. E. H. Faile & Co., 441 Lexington Ave., engrs. and archts.

Tex., Brownsville—Pan-American Airways, Inc., G. L. Reil, vice pres., taking bids 1 story, 120 x 120 ft., steel airplane shop. E. L. Odell, Brownsville, ch. engr. Noted July 18.

Contracts Awarded

Mass., Cambridge—C. J. Cox Engineering Co., 625 Putnam Ave., altering and constructing 1 story, brick, some steel shop addition, concrete found., Putnam Ave., to J. C. Pitcher, 46 Cornhill, Boston.

UNCLASSIFIED

Proposed Work

Calif., Stockton—PLANT—Standard Rock Co. Builders Bldg., F. R. Beerman, pres., gravel rock and sand plant, Wallace Section. $40,000 or more.

Colo., Lamar — TELEPHONE REPEATER STATION — Mountain States Telephone & Telegraph Co., 800 14th St., Denver, and American Telephone & Telegraph Co., 1421 Champa St., Denver, soon let contract building. $50,000. Dyer & Nedherny, 1st Natl. Bank Bldg., Chicago, Ill., archts.

Colo., Pueblo—RADIO BROADCASTING STATION—Western Air Express, 1658 Champa St., Denver, and Mid-Continent Air Lines, Kansas City, Mo., radio broadcasting station.

Conn., Bridgeport — SERVICE and SALES STATION—Chevrolet Co., c/o Fletcher-Thompson, Inc., archts., 542 Fairfield Ave., brick, steel, Fairfield Ave. Est. $100,000.

Conn., East Hartford (br. Hartford) — BAKERY — Economy Grocery Co., M. Joseloff, dist. mgr., Oakland Ave., East, plans by Monks & Johnson, archts. and engrs., 99 Chauncy St., Boston, Mass., 3 story, 70 x 200 ft., brick, steel, concrete, Oakland Ave. $175,000. Noted May 16.

Conn., East Hartford (br. Hartford) — BAKERY — First National Stores, Inc., 5 Middlesex Ave., Somerville, Mass., plans by Monks & Johnson, 99 Chauncy St., Boston, Mass., 3 story, basement, brick, steel, plain found., Oakland Ave. $40,000 or more.

Conn., Hartford—MANUFACTURING PLANT—C. Malmfeldt, archt., 15 Lewis St., soon lets contract 2 story, 50 x 100 ft., brick, rein.-con., plain found., Bartholomew St., for Liner-Atwell Co., 69 Bartholomew Ave. $65,000.

Conn., Hartford—SERVICE and SALES STATION—L. Schoolnik, 44 Hebron St., plans by Berenson & Moses, 252 Asylum St., 1 story, basement, 60 x 130 ft., brick, rein.-con., Farmington Ave. Est. $60,000.

La., Shreveport—COMMERCIAL—A. Maurers Bakery, J. D. P. Lyles, mgr., sketches 3 story, basement, rein.-con., brick, Southern Ave. $150,000.

Mass., West Springfield (br. Springfield)—ENGINE HOUSE—Boston & Albany R.R. Co., G. A. Kirley, ch. engr., Boston, 1 story, concrete, steel, plain found. incl. four 142 ft. fourteen 122 ft. and eleven 79 ft. stalls.

Mich., Detroit—AERONAUTICAL LABORATORY and MACHINE SHOP—University of Detroit, Livernois Ave. and Six Mile Rd., brick, steel, rein.-con., Six Mile Rd. $75,000. Engineer and architect not selected.

Mich., Detroit—WAREHOUSE and OFFICE—Boyer-Campbell Co., 362 Brush St., plans by C. F. J. Barnes, 415 Brainard St., 3 story, part basement, 117 x 120 ft., brick, plain found., St. Antoine St. $150,000.

Mich., Flint—WAREHOUSE—E. Rosenberg, mgr., New Orleans Fruit House, plans by J. W. Cook, Flint, 3 story, basement, 70 x 150 ft., brick, rein.-con., plain found., Grand Trunk R.R.

O., Cleveland—AUTO REPAIR SHOP and GAS STATION—Automobile Service Corp. of America, 45 Nassau St., New York, plans by Shattuck & Loyer, 134 North LaSalle St., Chicago, Ill., 1 story, 27 x 256 ft., auto repair shop, 1 story, 27 x 120 ft. gas service station, 1 story, 110 x 115 ft. wash house, brick, steel, concrete, 7404 Euclid Ave. $100,000.

O., Cleveland—MACHINE SHOP—J. Rutkowski, Inc., 5200 Harvard Ave., 1 story, 90 x 116 ft., brick, steel, 5200 Harvard Ave. $40,000. Private plans.

O., Cleveland—POSTAL SUB-STATION—H. D. Sherwood, c/o M. C. Rousseau, archt., Bulkley Bldg., 2 story, 80 x 95 ft., brick, rein.-con., East 130th St. $50,000. U. S. Government, lessee.

Va., Hopewell—American Chatillon Corp., 393 7th Ave., New York and Tubize Silk Co., 2 Park Ave., New York, and Hopewell, sketches rayon plant. To exceed $1,000,000.

B. C., Trail—FERTILIZER PLANT—Consolidated Mining & Smelting Co., of Canada, Trail, fertilizer plant, $7,500,00. Taking bids new equipment. Private plans.

B. C., New Westminster—CHEMICAL PLANT—Triangle Chemical Co., rebuilding chemical plant, recently destroyed by fire. $250,000.

B. C., New Westminster—PAPER PLANT—Westminster Paper Co. rebuilding plant, recently destroyed by fire. $1,000,000.

Ont., Petrolia—OIL REFINERIES—Canadian Oil Companies Ltd., B. Corey, mgr., extending plant, increasing storage units, Tank St. $60,000. Private plans.

Ont., Port Arthur—DAIRY—Thunder Bayt Co-operative Dairy Ltd., dairy building, Owen St. $50,000.

Ont., Toronto — ROUNDHOUSE — Canadian Pacific Ry. Co., B. Ripley, engr. (Ontario Dist.), roundhouse, north of Fleet St. near John St. $550,000.

Ont., Toronto—TEMPLE—Labor Temple Co. Ltd., 167 Church St., 5 story, basement, concrete, brick, stone, steel, Bloor St. $200,000. Engineer and architect not selected.

Que., Amqui—MACHINERY PLANT—I. B. R. Levesque, Ltd., general machinery plant. $40,000.

Que., Granby — PLANT — C. Staphn of Canada, Ltd., plant addition, $100,000.

Que., Montreal—GARAGE—H. Birks & Co. Ltd., plans by Nobbs & Hyde, 14 Phelps Sq., garage, Drummond St. $250,000.

Que., Montreal — GENERATOR PLANT — City, electric generator plant. $350,000. H. A. Terreauet, city engr.

Que., Montreal—PLANT—Canada Dry Ginger Ale Ltd., 153 Shelburne St., Toronto, plant, $175,000.

Que., Montreal East — PLANT — McColl-Frontenac Co. Ltd., 1456 Notre Dame St. E., Montreal, plant, $250,000.

Bids Asked

Ind., Indianapolis—DAIRY AND CREAMERY PLANT—W. H. Roberts, 118 South Dela St., taking bids 25 story, 100 x 200 ft., steel, rein.-con., 42nd St. and Millersville Rd. $150,000. C. Byfield Peoples Bank Bldg. archt.

N. J., Newark—DELIVERY, DISTRIBUTION STATION—S. S. Kresge Co., Kresge Bldg., Detroit, Mich., bids about Sept. 17, general contract on revised plans rein.-con., New Welsey St. To exceed $50,000. A. Merkt, 175 5th Ave., New York, archt.

O., Zanesville—POWER SUB-STATION—Ohio Power Co., Canton, subsidiary of American Gas & Electric Co., 30 Church St., New York, taking bids general contract 2 story, National Pike. To exceed $40,000.

Pa., Allentown—BAKERY—General Baking Co., 420 Lexington Ave., New York, bids about Sept. 15, general contract, Union Blvd. To exceed $40,000. C. B. Comstock, 122 East 43d St., New York, archts.

Ont., Port Stanley—COKING PLANT—S. B. S. Everson, c/o Cities Service Co., Ellicott Sq., Buffalo, N. Y., taking bids coking plant, for Dominion Gas Co., Hamilton, Ont., subsidiary of Cities Service Co. and H. L. Doherty & Co., 60 Wall St., New York. $3,000,000.

Bids Received

Wash., Tacoma — COLD STORAGE — Port Comrs., 4 story, 150 x 200 ft. cold storage plant, 1,000,000 ft. refrigeration, Port of Tacoma, from Puget Sound Bridge & Dredging Co., Central Bldg., Seattle. $240,986.

Contracts Awarded

Calif., Los Angeles—PLANT—Cudahy Packing Co., 803 Macy St., 3 story, 73 x 45 ft., hydrogenerating building, 3 story, 47 x 49 ft. addition for lard refinery, 1 story, 40 x 61 ft. hydrogen plant, steel concrete, to Pozzo Constr. Co., 421 Macy St., $70,000. Noted June 20.

Ga., Atlanta—WAREHOUSE—Great Atlantic & Pacific Tea Co., 4 story, 125 x 235 ft., rein.-con., brick, East Fair St., to Thomas A. Monahan Constr. Co., 710 Union Title Bldg., Indianapolis, Ind., $200,000.

Ill., Edwardsville — CREAMERY — Edwardsville Creamery Co., 2 story, 50 x 100 ft., brick, concrete, hollow tile addition, to A. J. Hoffman, 293 Springer St. Est. $40,000.

Ind., Indianapolis—BAKERY—General Baking Co., 420 Lexington Ave., general contract 135 x 158 ft., brick, steel, Indiana Ave. and Canal St., to W. S. Bellows Constr. Co., Hersk Bldg., Oklahoma City, Okla. Est. $200,000. Noted June 20.

Ia., Waterloo—PACKING PLANT—Henschien & McLaren, archts., 1637 Prairie Ave., Chicago, Ill., 6 story, brick, to H. A. Meine Co., Waterloo, for Roth Packing Co., Waterloo. Est. $350,000. Noted June 27.

Mo., St. Louis—WAREHOUSE and STORAGE—Marquette Cement Mfg. Co., Louderman Bldg., 1 story, 55 x 55 ft. rein.-con. warehouse, 6 rein.-con. storage silos, to Gamble Constr. Co., 620 Chestnut St., St. Louis. Est. $55,000.

N. Y., Buffalo—SERVICE STATION and WAREHOUSE—Firestone Tire & Rubber Co., Hanna Bldg., Akron, O., general contract 3 story, brick, stone, steel, concrete, to J. W. Cowper Co., M.&T. Bldg. Est. $150,000. Noted July 4.

N. Y., Ithaca — LAUNDRY — Cornell University, 3 story, laundry to A. H. McPherson, 201 White Park Rd. Est. $100,000.

N. Y., Laurel Hill (mail Flushing)—Nicholas Copper Co., Hall and Hobson Aves., general contract 3 story, 77 x 77 ft. plant addition, to Leddy & Moore, 70 West 40th St., New York. Est. $40,000. Contractor soon takes bids on materials. Noted July 11.

O., Cleveland—AUTO SALES and SERVICE—Arcade Garage Co., c/o A. L. Licker, Guarantee Title Bldg., 1 story, 80 x 428 ft., brick, steel, 1950 East 105th St., to J. Simon Constr. Co., 785 East 88th St. Est. $150,000.
Steam heating to be installed.

O., Cleveland—MAUSOLEUM—United Jewish Cemeteries, c/o S. Goldhamer, secy., 507 Hanna Bldg., 1 story, 33 x 64 ft., and 40 x 77 ft., bronze, marble, granite, steel, concrete, Mayfield Rd., to S. W. Emerson Co., 1836 Euclid Ave. Est. $400,000.

O., Youngstown — WAREHOUSE — Genfire Steel Co., 4 story, basement, 60 x 200 ft., brick, steel, to Rust Eng. Co., Koppers Bldg., Pittsburgh. Est. $200,000.

Tex., Dallas—EXCHANGE—Southeastern Bell Telephone Co., c/o D. D. Dean, 808 Telephone Bldg., additional stories, on present building and new 4 story unit in rear, brick, steel, concrete, to Henger & Chambers, 1600 Dallas Natl. Bank Bldg., fee basis.

Ont., Toronto—BOILER HOUSE—Fairgrieve, Ltd., 50 Dorcet St., 2 story, concrete, brick, to Goldie Constr. Co. Ltd., 32 Church St.

Ont., Toronto—BOILER and COMPRESSOR HOUSE—Consumers Gas Co., brick, steel concrete found., Bathhurst St., to Wells & Gray, Confederation Bldg., $60,000.

Buildings

Residential—Commercial—Public

RESIDENTIAL

(Apartments unless otherwise noted)

Bids Asked

Calif., Los Angeles—See "Contracts Awarded."

Calif., Los Angeles—L. L. Jones, archt., 2504 West 7th St., taking sub-bids 6 story, basement, 52 x186 ft., rein.-con., steel, Vermont Ave. south of Los Feliz Blvd., for A. Lawrence, c/o architect. $250,000. Noted July 4.

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Buildings—Residential (Continued)

Calif., Los Angeles—M. Mann & Co., 650 South Grand Ave., taking bids on sub-contracts 6 story, basement, 60 x 150 ft., brick, rein.-con., steel, Fountain and Sweetzer Aves., $350,000. S. C. Lee, 531 Petroleum Securities Bldg., archt. Noted July 25.

Ill., Chicago—A. S. Alschuler, Inc., archts., 28 East Jackson Blvd., bids about Aug. 1, 2 story, basement, 101 x 124 ft., brick, incl. post office, West Division St. and North La Vergne Ave., for J. Kulp, 29 South La Salle St. $225,000.

Mass., Malden (br. Boston)—See "Contracts Awarded."

Mass., Pittsfield—Aug. 1, by Longfellow Hotel Service, c/o W. T. Butler, Dawes Ave., general contract hotel, $700,000. Consolidated Hotel Service, 247 Park Ave., New York, archts. Noted June 6.

Mo., St. Louis—Aug. 1, by Harry Newman, Inc., South Kingshighway, 3 story, basement, 127 x 185 ft., rein.-con., brick, stone, terra cotta, incl. stores, offices, Kingshighway and Bancroft Sts. $400,000. Private plans.

N. J., Hackensack—J. L. Tillback, archt., 173 Mair St., bids about Aug. 15, general contract 5 story, basement, 160 x 180 ft., brick, steel, plain found., Prospect Ave. $350,000.

N. J., Jersey City—See "Contracts Awarded."

N. J., Morristown—B. Cirlincione, archt., 229 South Orange Ave., Newark, bids about Aug. 15, general contract brick, steel, incl. stores, garages, plain found., Speedwell Ave., for Owner, c/o architect. $155,000.

N. J., Newark—July 26, by Guilbert & Betelle, archts., 20 Branford Pl., 4 story, brick, steel nurses' home, plain found., Wallace St., for Newark Memorial Hospital, A. Goertz, pres. Bd. of Trustees, 340 Bank St. $150,000. Noted May 30.

N. J., Roselle—See "Contracts Awarded."

N. J., Somerville—G. Pomerantz, 26 North Gaston Ave., bids about Aug. 1, general contract, 3 story, basement, 85 x 100 ft., brick, steel, rein.-con., plain found., North Gaston Ave. $150,000. C. L. Goldberg, 921 Bergen Ave., Jersey City, archt.

N. J., Weehawken—North Hudson Hospital, Park Ave., bids about Aug. 15, general contract 5 story, basement, brick, steel nurses' home and training school, plain found., Columbia Terrace. $165,000. P. Vivarttas, 110 48th St., Union City, archt. Noted June 20.

N. J., West Englewood—P. J. Jossier, archt., 240 Broad Ave., Palisades Park, bids about Aug. 15, general contract 5 story, basement, 100 x 160 ft., brick, steel, plain found., State St. and Ackerman Pl., for Wilbendon Realty Co., c/o architect. $250,000. Noted June 20.

N. Y., Hollis (br. Jamaica)—See "Contracts Awarded."

N. Y., Long Beach — J. Manowitz, 96 5th Ave., New York, taking bids general contract 6 story, 100 x 150 ft., brick, timber, Bway. and Magnolia Blvd. $400,000. H. Hurwit, 41 West 33rd St., archt. Noted June 20.

N. Y., Long Island City — See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

Pa., Phila.—See "Contracts Awarded."

Contracts Awarded

Calif., Long Beach—Ocean Ave. Holding Co., 241 East 1st St., 14 story, basement, 120 x 240 ft., brick, steel apartment hotel, to Thebo, Starr & Anderson, Sharon Bldg., San Francisco. $2,000,000.

Calif., Los Angeles—R. D. Albord, 5 story, basement, 93 x 119 ft., brick, steel, 2225 Highland Ave., to L. M. Halper, 606 Hibernian Bldg., $300,000.

Calif., Los Angeles—B. A. Brennan Co., Inc., 13 story, basement, rein.-con., to Rogers Cassell & Coffey, 1442 Dayton Way, Beverly Hills, $400,000. Noted Apr. 4.

Ill., Chicago—Ronnenberg, Inc., archts., 10 South La Salle St., masonry and concrete contracts 8 story, basement, 33 x 150 ft., to R. W. Meyer, 4192 Elston Ave.; carpentry, to Halvorsen & Almquist, 5302 North Kedzie Ave.; plumbing and heating, to Nilson Bros., 3222 North Halsted St.; elevators, to Illinois Elevator Co., 2710 West Lake St., for M. L. E. Jensen, c/o architects. Est. $360,000. Noted June 6.

Ill., Chicago—McNally & Quinn, archts., 10 South Dearborn St., masonry and carpentry contract 20 story, basement, 90 x 150 ft., Dearborn and Maple Sts., to C. E. Erickson, 4753 Bway., cut stone, to E. E. Skoglund, 5555 Lincoln Ave., for C. A. Carlson, 4001 Sheridan Rd. Est. $2,000,000.

Md., Baltimore—White Constr. Co., Garrett Bldg., 8 story, 104 x 123 ft., brick, concrete, steel, 817-25 St. Paul St., day labor. $250,000. Frank Russell White, Garrett Bldg., archt.

Mass., Boston—Beacon Chambers, 19 Myrtle St., altering and constructing 4 story, basement, brick addition, plain found., Myrtle St., to Crane Constr. Co., 80 Boylston St. Est. $150,000.

Mass., Boston — Estate of Lotta Crabtree, C. R. Edwards, executor, 234 Boylston St., Boston, altering and constructing 8 story, basement, brick, stone hotel and store, addition to Hotel Brewster, plain found., to Leighton-

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Mitchell, Co., 99 Chauncy St. Est. exceeds $150,000. Noted Apr. 25.

Mass., Brookline—S. Cooper, 60 Boylston St., Malden, 3 unit, 3 story, basement, irregular sized, brick, plain found., Greenmouth St., to M. Druss, 60 Boylston St. Est. $150,000.

Mass., Malden (br. Boston) — D. and J. Shahbas, Lynnfield Centre, 4 story, basement, 90 x 95 ft., brick, stone, plain found., Washington St., and Mountain Ave., separate contracts. $150,000. B. E. Porter, 73 Tremont St., Boston, archt.

Mont., Great Falls—Metropolitan Building Corp., general contract 3 story, basement, brick, rein.-con., to Pappin & Dudley, Great Falls. Est. $150,000.

Pa., Phila.—Kentwell Hall Corp., 1600 Walnut St., 4 story, basement, 76 x 169 ft., rein.-con., brick, steel, plain found., Sprague and Hortoner Sts., separate contracts. $250,000. Stetler & Dysher, 709 Chestnut St., archts.

N. J., Jersey City — M. Kominski, Tube Concourse Bldg., 5 story, basement, 125 x 125 ft., brick, steel, plain found., Kensington Ave., separate contracts. $200,000. C. Shilowitz, 26 Journal Sq., archt. Noted July 18.

N. J., North Bergen—S. Engle, 237 29th St., 5 story, basement, 125 x 135 ft., brick, steel, plain found, Hudson Blvd. and 39th St., separate contracts. $250,000. C. Shilowitz, 26 Journal Sq., Jersey City, archt.

N. J., Roselle — D. C. & T. Corp. (J. Tomasulo), 531 West Westfield Ave., 4 story, basement, brick, steel, plain found., 321 East 2nd Ave. $150,000. Owner builds. M. Kraut, 3010 Hudson Blvd., Jersey City, archt. Owner taking bids separate contracts. Noted July 18.

N. Y., Hollis (br. Jamaica)—Island Land Corp., J. V. Farmers, pres., 6 story, 75 x 93 ft. Hollis Ave., and 6 story, 51 x 66 ft., Hollis Ave. and 95th St., separate contracts. $350,000. W. Hohauser, 17 West 44th St., New York, archt. Noted June 20.

N. Y., Long Island City—W. and I. Constr. Co., 3451 89th St., 4 story, 95 x 100 ft., brick, timber, 53rd Dr. and 64th St., day labor and separate contracts. $150,000. B. Dreisler, 153 Remsen St., Brooklyn, archt.

N. Y., New York—E. Krulewitch, 45 West 34th St., 15 story, 100 x 102 ft., brick, steel, 241 East 72nd St., separate contracts. $750,000. Gronenberg & Leuchtag, 1385 Bway., archts. Noted July 11.

Ont., St. Catharines — Welland House, 34 Ontario St., general contract 3 story, brick, stone, steel hotel addition, to Reginald Timm Constr. Co., 36 St. James St. Est. $150,000.

Ont., Toronto—C. & C. Investments Ltd., 3 Jane St., 3 story, basement, brick, concrete, stone, Riverside Dr., to F. J. Cummings & Co., 3 Jane St. Est. $250,000.

PUBLIC

Proposed Work

Calif., Riverside—HALL OF JUSTICE—Riverside Co. plans by G. S. Wilson, Riverside, 3 story, basement, 60 x 135 ft., rein.-con. $175,000.

Mass., Newton Centre (br. Boston) — MEMORIAL, etc. — City of Newton, c/o Allen & Collins, archts., 75 Newbury St., Boston, sketches memorial building, Commonwealth Ave., $200,000; sketches by A. A. Shurtleff, 11 Beacon St., Boston, landscape work in preparation for above, $100,000.

Mich., Ecorse—MUNICIPAL—City plans by J. F. Kastler, 523 Detroit Savings Bank, Detroit, 2 story, basement, brick, steel, stone, plain found. $150,000.

N. Y., Utica—MUNICIPAL—City plans by Rushmer, Jennison & Pennock, Arcade Bldg., municipal building. $700,000.

Okla., Okmulgee—HALL—City, 2 story, basement convention hall, Creek St. $175,000. Engineer and architect not selected.

Ont., St. Catharines—CITY HALL—City plans by A. E. Nicholson, 46 Queen St., Church St. $250,000. Noted Nov. 15.

Que., Pontiac—COURT HOUSE and GAOL—Provincial Govt. soon takes bids court house and gaol. $175,000.

Bids Asked

Calif., San Diego—ACADEMIC—Aug. 13, by State Dpt. P. Wks., Sacramento, 2 story, rein.-con. building. $300,000.
Tile roofing.

Mass., Boston—FIRE STATION—July 31, by Fire Dpt., 60 Bristol St., 3 story, basement, 110 x 135 ft., brick, granite, limestone, plain found., Bowdoin Sq. $350,000. G. E. Robinson, 80 Federal St., archt. Noted Apr. 25.

Contracts Awarded

N. J., Nutley—PUBLIC SAFETY—Bd. Comn., Town Hall, general contract 2 story, basement, brick, steel, plain found., to Beyea Constr. Co., 973 Bway., Union City. Est. $150,000.

N. S., Halifax—ARCHIVE—Provincial Govt. public archive building, to MacDonald Constr. Co., 1102 Canadian Pacific Bldg., Toronto, Ont., $200,000.

Ont., Sudbury—JAIL—City, brick, stone, to G. Duncan, Romanet St., $250,000.

SCHOOLS

Proposed Work

Calif., Los Angeles—City plans by Architectural Dept. Los Angeles Bd. Educ., high school new auditorium, at Owensmouth. $300,000.

Calif., Los Angeles—University of Southern California plans by Parkinson & Parkinson, Title Insurance Bldg., 3 story, basement, 250 x 300 ft. women's gymnasium, rein.-con., steel, campus. $600,000. Noted June 20.

Calif., Riverside—University of California plans by G. S. Wilson, Riverside, experiment building. $150,000.

Colo., Grand Junction—Bd. Educ. School Dist. 1, Mesa Co., C. K. Holmburg, secy., sketches, building, $150,000.

Conn., South Norwalk—City of Norwalk Bd. Educ., sketches by F. I. Cooper, 172 Tremont St., Boston, Mass., brick, steel elementary school, $100,000; and high school, $400,000.

Conn., West Haven (br. New Haven)—Town, School Com., plans by R. W. Foote, 185 Church St., New Haven, 2 story, brick, steel addition, Noble St. $150,000.

Ill., East St. Louis—Bd. Educ., S. W. Moore, secy., 6th St. and St. Louis Ave., sketches by W. J. Kennedy, 1st. Natl. Bank Bldg., St. Louis, and N. S. Spencer & Son., 180 North Michigan Ave., Chicago, Ill., Junior High School, 2 and 3 story, basement, brick, stone, rein.-con., Caseyville Ave. and 40th St., $450,000; plans by B. A. Mueller, Arcade Bldg., East St. Louis, Ill., Bluffview Grade School.

Ill., Maywood — Proviso Township High School Dist. 208 plans by J. C. Llewellyn & Co., 38 South Dearborn St., brick high school, 1st Ave. and Madison St. $1,100,000. Noted May 23.

Ind., Bloomington — Indiana University plans by R. F. Daggett, 922 Continental Bank Bldg., chemistry building. $400,000.

Ind., Greencastle—De Paw University, A. Oxnam, pres., plans by R. F. Daggett, 922 Continental Bank Bldg., Indianapolis, stone, colonial design, recitation hall. $250,000.

Mass., Belmont (br. Boston)—Town, School Com., plans by H. T. Underwood, 46 Cornhill, Boston, 2 story, basement, irregular sized, brick addition to junior high school, plain found., Washington St. corner Oakley St. $200,000. Noted May 2.

Mass., Brighton (sta. Boston)—City of Boston, Schoolhouse Dpt., City Hall, Boston, sketches by A. J. Carpenter, 1 Beacon St., Boston, Probably brick, stone, addition, Corey Rd., Bennett Dist. $175,000.

Mass., Danvers—Town, A. Smith, chn., plans by C. G. Loring, 7 Water St., Boston, Senior High School, Conant St. $325,000. Noted July 11.

Mass., Dorchester (sta. Boston)—City of Boston, Schoolhouse Dpt., plans probably 2 story, basement, brick, limestone, Roger Wolcott Dist. $200,000. Engineer and architect not selected.

Mass., Lawrence—City, L. J. O'Leary, City Hall, school. To exceed $150,000. Engineer and architect not selected.

Mass., Marlboro—City, W. Temple, mayor and chn. com., 2 story, basement, brick, stone, Hildreth St. $150,000 or more. Engineer and architect not selected.

Mass., Pittsfield—City, C. L. Hibbard, chn. building com., soon takes bids 2 story, basement, brick, stone high school, plain found. $200,000. J. D. Leland & Co., Statler Bldg., Boston, archts.

Mass., Wakefield—Town, F. J. Henkel, chn. building com., soon takes bids altering and constructing 2 story, basement, brick, limestone, steel addition, Montrose Dist., plain found. $150,000. E. M. Bridge, 248 Boylston St., Boston, archt. Whidden-Beekman Eng. Co., 250 Stuart St., Boston, engrs. Noted July 18.

Mich., Battle Creek — Bd. Educ. plans by Chanel & Chute, 717 Post Bldg., 2 story, basement, 12 room, Maple St. $150,000, 2 story, basement, 8 room, Champion St., $140,000, both rein.-con., brick, plain founds. Steam heating, ventilating, boilers, etc.

Mich., Dearborn—Bd. Educ. plans by G. D. Mason Co., 409 Griswold St., Detroit, 2 story, basement, brick, steel, concrete, plain found., Jim Daly Rd. $150,000.

Mich., Detroit—Library Comn., Public Library Bldg., plans by Burrowes & Eurich, 415 Brainard St., 2 story, basement, brick, stone, concrete branch library, Oakman Blvd., $190,000.

N. J., Bayonne—Bd. Educ., 651 Bway., plans by D. G. Anderson, 718 Bway., 3 story, 56th and 57th Sts. To exceed $150,000. W. W. Chapin, 110 East 42nd St., New York, engr. Noted Dec. 27.

N. J., East Paterson—Bd. Educ., Boro Hall, rejected bids 2 story, brick, steel, plain found. $150,000. Will readvertise. Lee & Hewitt, 152 Market St., Paterson, archt. Noted July 4.

N. J., Englewood—Bd. Educ., 11 Eagle St., 2 story, basement, brick, steel high school, plain found., Lexow Tract. $350,000. Engineer and architect not selected.

N. J., Irvington — Bd. Educ., 1253 Clinton Ave., plans by V. H. Strombach, 1243 Springfield Ave., 2 story, basement, brick, steel, Berkeley Terrace. $700,000. Noted July 4.

N. J., Piscataway—Bd. Educ., Township Hall, plans by J. N. Pierson & Son, 705 Park Ave., Plainfield, 2 story, basement, brick, steel, rein.-con., plain found. $200,000. Noted July 18.

Schools (Continued)

N. J., Raritan — Bd. Educ., Raritan Twp., Township Hall, will not build 2 story, basement, brick, steel addition to Oak Tree School, plain found. $150,000. Project abandoned. Noted May 16.

O., Akron—Bd. Educ., I. Moses, clk., plans by M. M. Konarski, Central High School, Cleveland, 3 story, basement, brick, steel, concrete high school, North Hill Dist. $500,000.

O., Cleveland—Bd. Educ., F. G. Hogen, dir., plans by G. M. Hopkinson, Auditorium Garage Bldg., 3 story, basement, brick, steel, concrete, Montrose Ave. and Riverside Dr. $300,000.

O., Maple Heights (br. Cleveland) — Bd. Educ. sketches by A. M. Allen Co., 7016 Euclid Ave., Cleveland, 3 story, brick, steel, concrete high school. $250,000.

O., Mentor (br. Willoughby)—Bd. Educ. of Mentor Rural School Dist., C. Lenther, clk., plans by Miller & Son, 27 West Madison St., Youngstown, 2 story, brick, steel, concrete high school addition. $200,000.

S. C., Orangeburg—City, sketches by J. B. Urquhart, Palmetto Bldg., Columbia, altering and constructing addition to Sheridan School, Ellis Ave., $45,000; gymnasium and additional brick, stone schools. $175,000 voted for same.

Wis., West Allis—City plans by Lindl-Schuette, Inc., 429 Bway., Junior High School. $360,000.

Ont., North Bay—City Council plans by S. B. Coon & Son, 4 St. Thomas St., Toronto, vocational school, incl. electric motor mechanics rooms, woodworking and machine shops, laboratories, gymnasium, telegraphy room. $350,000.

Que., Montreal—F. X. Bellane, 1538 Rachel St. E., school. $200,000.

Bids Asked

Calif., San Diego—Aug. 13, by G. B. McDougall, state archt., Pub. Wks. Bldg., Sacramento (1st unit), 2 story, basement, rein.-con. administration building, 35,000 sq.ft. floor space, State Teachers College. $185,000.

Ill., Chicago — Lowenberg & Lowenberg, archts., 111 West Monroe St., taking bids 3 story, 70 x 106 ft., stone, St. Louis Ave. and Douglas Blvd., for Hebrew Theological College, c/o architects. $150,000. F. A. Randall, 222 North Wells St., engr.

Ind., Indianapolis—Aug. 1, by School Comrs., 150 North Meridian St., P.S. 15, brick, steel, incl. auditorium, manual training building, Keystone and East Michigan Sts. $150,000. W. H. Albersmeier, 508 Raub Bldg., archts. Noted June 13.

Ind., Indianapolis—Aug. 1, by School Comrs., 150 North Meridian St., School 81, 2 story, basement, brick, stone, rein.-con., 17th St. and Park Ave. $150,000. Kopf & Deery, K. of P. Bldg., archts. Noted June 13.

Ind., Indianapolis—Aug. 1, by School Comrs., 150 North Meridian St., P. S. 82, brick, stone, rein.-con., English and Emerson Aves. $150,000. Harrison & Turnock, Bd. of Trade Bldg., archts. Noted June 13.

Ind., Indianapolis—Aug. 1, by School Comrs., 150 North Meridian St., P. S. 49, brick, rein.-con., 1902 West Morris St. $150,000. Bishop, Knowlton & Carson, 312 North Meridian St., archts. and engrs. Noted June 13.

Ind., Indianapolis—Aug. 1, by School Comrs., Irvington High School, 3 story, basement, brick, rein.-con., Riley Ave. and East Washington St. $600,000. McGuire & Shook, North Meridian St. archts. J. M. Rotz Co., Merchants Bank Bldg., engrs. Noted June 13.

Ind., Speedway City—Aug. 1, by School Comrs., brick, steel, $150,000. McGuire & Shook, North Meridian St., Indianapolis, archts.

Kan., Concordia—Bd. Educ., bids about Aug. 15, 2 story, basement, brick, stone, rein.-con. high school, $275,000. Proudfoot, Rawson, Souers & Thomas, 810 Hubbell Bldg., Des Moines, Ia., archt. Noted June 6.

Mass., Woburn—City, H. P. Johnson, mayor, bids about Aug. 1, 2 story, basement, brick high school, plain found., Montvale Ave. $160,000. Kilham, Hopkins & Greeley, 9 Park St., Boston, archts. Noted Apr. 18.

Mich., Ann Arbor—University of Michigan, bids about Oct. 1, general contract dormitory, $750,000. York & Sawyer, 100 East 42nd St., New York, archt. Noted July 18.

Mich., Birmingham—Aug. 5, by Bd. Educ., 2 story, basement, 208 x 268 ft., brick, steel, rein.-con., plain found., Barnum site. $295,000. F. D. Madison, Royal Oak, archt.

Mich., Calumet—Bd. Educ., taking bids 2 story, 200 x 200 ft., brick, stone, incl. gymnasium. $300,000. J. H. Chubb, 109 North Dearborn St., Chicago, Ill., archts. Noted May 2.

Mich., Flint—July 30, by Bd. Educ., 2 story, basement, brick, steel, stone, rein.-con., Durand St. $220,000. Malcolmson & Higginbotham, 1219 Griswold St., Detroit, archts.

Minn., Albert Lea—Aug. 1, by Hamilton Fellows & Neved, archts., 814 Tower Court, Chicago, Ill., altering and constructing 3 story, 75 x 169 ft., brick high school addition, for Bd. Educ., R. Anderson, clk. $250,000. Noted Apr. 11.

N. J., Highlands—Bd. Educ., Boro Hall, bids about Aug. 15, 2 story, basement, 100 x 165 ft., brick, steel, plain found., Navesink and Waterwitch Sts. $165,000. L. V. Pohlman, 80 Broad St., Elizabeth, archt.

N. J., Highlands—Aug. 7, by Bd. Educ., 2 story, basement, 110 x 156 ft., brick, terra cotta, $200,000. L. Z. Pohlman, 80 Broad St., Elizabeth, archt. Noted July 18.

N. J., Kearny—Bd. Educ., Town Hall, bids about Aug. 15, 2 story, basement, brick, steel addition to Garfield School, plain found. $200,000. Guilbert & Betelle, 20 Branford Pl., Newark, archt. Noted July 11.

N. J., Riveredge—Bd. Educ., Boro Hall, bids about Aug. 15, 2 story, basement, brick, steel, rein.-con. addition Roosevelt School, $200,000. E. Sibley, 1034 Edgewood Lane, Palisades, archt. J. L. E. Tillack, 173 Main St., Hackensack, assoc. archt. Noted July 11.

N. Y., Brooklyn—Aug. 8, by W. C. Martin, archt. and supt. school buildings, Flatbush Avenue extension and Concord St., P. S. 232 (Winthrop Junior High School), Winthrop St., 52nd and 53rd Sts., for Bd. Educ., 500 Park Ave., New York.

N. Y., Long Island City—July 30, by W. C. Martin, archt. and supt. school buildings, Flatbush Avenue extension and Concord St., Brooklyn, P. S. 52, New York Blvd. between Comfort and Grand Aves., Springfield, for Bd. Educ., 500 Park Ave., New York.

N. Y., New York—July 30, by W. C. Martin, archt. and supt. school buildings, Flatbush Avenue extension and Concord St., Brooklyn, addition to P. S. 71, Roberts Ave. between Jarvis and Hobart Aves., for Bd. Educ., 500 Park Ave.

Wis., Madison—Aug. 6, by Bd. Regents, University of Wisconsin, M. E. McCoffrey, secy., 3 story, 230 x 230 ft., rein.-con., brick, steel school for mechanical engineers, plain found. $577,000. A. Peabody, 2114 Chadbourne Ave., archt. Noted May 23.

Bids Received

N. Y., Flushing—W. C. Martin, archt. and supt. School Buildings, Flatbush Avenue extension and Concord St., Brooklyn, July 18, general contract P. S. 154, 162nd St., 75th Ave. and 75th Rd., Flushing-Hillcrest, for Bd. Educ., 500 Park Ave., New York, from Concord Constr. Co., 476 Seneca Ave., Brooklyn, $292,700; heating, from Raisler Heating Co., 129 Amsterdam Ave., New York, $56,900. Noted July 4.

N. Y., Hollis (br. Jamaica)—W. C. Martin, archt. and supt. School Buildings, Flatbush Avenue extension and Concord St., Brooklyn, July 18, general contract P. S. 135, 89th Ave., 207th and 208th Sts., for Bd. Educ., 500 Park Ave., New York, from Concord Constr. Co., 476 Seneca Ave., Brooklyn, $291,700; heating, from J. H. McCann, $57,000. Noted July 4.

O., North Olmstead (br. Cleveland) — Bd. Educ., C. J. Oetzel, clk., brick, rein.-con. high school, from Nicholas Miller, Massillon, $166,966. Noted June 27.

Mass., Medford (br. Boston) — City, School Building Com., City Bldg., 3 story, basement, 65 x 240 ft., and 65 x 115 ft., brick, addition to Senior High School, plain founds., from J. E. Dyer Constr. Co., 80 Boylston St., Boston, $435,400; heating and ventilating, from Readon Bros., 341 Union St., Lynn, $117,747. Noted July 4.

N. J., Plainfield—Bd. Educ., 119 West 9th St., general contract 2 story, basement, brick, steel, plain found., West 9th St., from C. S. Rollerson, Inc., 400 Watchung Ave. $248,457.

N. J., Sayreville—Bd. Educ., Boro Hall, general contract 2 story, basement, brick, steel, plain found, from J. Check, 59 Main St., South River. Est. $150,000. Noted June 27.

N. J., Westfield—Bd. Educ., Clark St., general contract 2 story, basement, brick, steel, plain found., from M. Reis, Perth Amboy, $225,000; heating and ventilating, from G. J. Tobin, Minnisink Rd., Plainfield, $37,000. Noted June 27.

Contracts Awarded

Conn., New Haven — Yale University, Yale Corp., 4 brick, steel dormitories, to Marc Eidlitz & Sons, 41 East 42nd St., New York. Est. $500,000. Jan. 17.

Ind., Indianapolis—Indiana Blind School, 75th St. and College Ave., general contract 4 dormitories, to Service Constr. Co., Castle Hall. Est. $425,000. Noted July 18.

Mass., Concord—Middlesex School, F. Winsor, 4 story, basement, irregular sized, brick dormitory, plain found., to E. F. Minor Building Co., 25 Foster St., Worcester. Est. $150,000. Noted July 11.

Mich., Ann Arbor—S. Smith, secy. University of Michigan, 2 story, basement, 190 x 240 ft., brick, steel, plain found., to Spence Bros., Saginaw. Est. $500,000. Noted June 13.

Mich., Muskegon Heights—Bd. Educ., 2 story, basement, 190 x 210 ft., brick, steel, concrete, stone, plain found., to Peterson, Colwell Co., Builders & Traders Exch. Bldg., Minneapolis, Minn. Est. $175,000. Noted June 27.

N. J., Maplewood (br. South Orange)—Bd. Educ., School Dist. of South Orange, general contract 2 story, basement 75 x 145 ft., brick, steel addition, plain found., to Perth Amboy Constr. Co., 6 Madison Ave., New York. Est. $150,000. Noted May 30.

N. J., Morristown—F. J. Murphy, archt., 280 West 246th St., New York, general contract 4 story, basement, 50 x 180 ft., brick, steel, to Hugh Montague & Son, Inc., Exchange Pl., Jersey City, for Church of Our Lady of Grace. Est. $150,000.

N. J., Plainfield—Bd. Educ., 119 West 9th St., general contract 2 story, basement, brick, steel high school, plain found., to C. S. Rollerson, Inc., 620 Stelle Ave., $252,451. Noted June 27.

O., Euclid (br. Cleveland)—Bd. Educ., G. C. Witmer, clk., 1550 Chardon Rd., Cleveland, 3 story, basement, 120 x 144 ft., brick, steel, concrete addition, to Hebing Co., 1832 West 54th St., Cleveland, $219,272. Noted June 27.

O., North Olmstead (br. Cleveland) — Bd. Educ., C. J. Oetzel, clk., 2 story, basement, 72 x 200 ft., brick, steel, concrete, to C. L. Knowlton, Bellfontaine, O., $176,000.

Okla., Tulsa—Bd. Educ., 410 South Cincinnati St., Red Fork School, to Manhattan Constr. Co., Court Arcade Bldg., Tulsa, $103,500; Lombard School, to Rucks Brandt Constr. Co., 1012 Mid-Continent Bldg., $61,789; Lowell School, to W. R. Grimshaw Constr. Co., 402 Kennedy Bldg., $69,750. Grand total $235,039.

Pa., Phila.—G. I. Lovatt, archt., 220 South 16th St., 2 story, basement, 100 x 120 ft., steel, stone, plain found., Conshocken, to Morlock Davis Co., 15th and Race Sts., for St. Mathews Roman Catholic Church, P. J. Gallager, pastor. Est. $164,000. Noted June 27.

Man., Winnipeg—School Comm. addition to Maple Leaf School, to Claydon Co. Ltd., Confederation Life Bldg., $200,622; plumbing, to Cotter Bros. Ltd., Fort St. $158,589.

OFFICES

Proposed Work

Calif., San Francisco—W. I. Garrenk, archt., De Young Bldg., sketches 16 story, basement, rein.-con., incl. theatre, Down Town Dist. $400,000.

Calif., San Francisco—Singer Sewing Machine Co., 26 O'Farrell St., plans by Bliss & Fairweather, Balboa Bldg., 4 story, basement, concrete, incl. stores Grant Ave. near Geary St. $150,000 or more.

Conn., Hartford—State, Washington St. $2,250,000. Engineer and architect not selected.

Ill., Chicago—I. P. Florsheim, 228 North La Salle St., sketches by Burnham Bros., 160 North La Salle St., 31 story, basement, 189 x 318 ft., rein.-con., steel, incl. stores, 250 seating capacity auditorium, caisson found., Canal, Monroe and Clinton Sts. $12,000,000.

Pa., Phila.—U. S. National Realty Co., c/o LeRoy B. Rothschild, archt., 249 South Broad St., 25 story, basement, 99 x 176 ft., rein.-con., brick, steel office, plain found., 1924-34 Market St. $3,000,000.

Ont., Toronto—A. L. Ellsworth, c/o Edwards & Young, 100 Adelaide St. W., 2 story, basement, 100 x 200 ft., brick, steel, concrete, incl. store, Bloor and Balmuto Sts. $160,000. Engineer and architect not selected.

Ont., Toronto—Empire Clothing Mfg. Co., Ltd., 197 Spadina Ave., office and factory, Adelaide St. and Spadina Ave. Est. $350,000.

Bids Asked

Calif., Los Angeles—Banks—Huntley Co., Stock Exch. Bldg., taking bids 13 story, basement, 60 x 130 ft., brick, steel, rein.-con., Spring St. between 6th and 7th Sts. $1,000,000. J. and D. Parkinson, 808 Title Insurance Bldg., archts. Noted May 30.

Ill., Chicago—W. Bernhard & Co., 820 Tower Court, bids about Aug. 1, Wells and Lake Sts., for M. Feiges, 201 West Lake St. $150,000.

N. J., Newark—Larkey Co., 128 Market St., taking bids general contract 21 story, incl. stores, Halsey and Market Sts. To exceed $150,000. Fanning & Shaw, 49 Ward St., Paterson, archt. C. Matlock, 949 Bway., New York, mechanical engr. A. D. Crosett, 205 East 42nd St., New York, structural engr.

New York—See "Contracts Awarded."

Ont., Toronto—Solloway, Mills & Co., Metropolitan Bldg., C. B. Dolphin, 10 Leader Lane, bids about July 31, 5 story, basement, 50 x 136 ft., brick, steel, concrete found, Yonge St. $165,000. Noted June 20.

Contracts Awarded

Calif., Los Angeles—Community Securities Co., C. E. Toberman, pres., 2 story, 140 x 330 ft., brick, rein.-con., to Meyer & Holler Wright & Callendar Bldg., $225,000.

Calif., San Francisco—Hilbar Properties Co., 918 Harrison St., 8 story, basement, rein.-con., incl. lofts, Sansome and Washington Sts., to Barrett & Hilp, 918 Harrison St., to exceed $500,000.

Ill., Chicago—Loebel, Schlossman & De Muth, archts., 612 North Michigan Ave., general contract 16 story, 80 x 170 ft., incl. stores, to R. C. Wiebolt Co., 1412 West Washington St., for J. R. Thompson Co., 350 North Clark St. Est. $1,000,000. Noted June 27.

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Offices (Continued)

Mich., Mt. Clemens—Leader Press Co., 61 North Walnut St., 7 story, basement, 50 x 108 ft., brick, rein.-con., incl. printing plant, plain found., North Walnut St., to Otto Misch Co., 159 East Columbia Ave., Detroit. Est. $150,000.

Mo., Kansas City—Walnut Assn., c/o A. C. Wiser, archt., 1319 R. A. Long Bldg., 13 story, basement, 48 x 107 ft., brick, stone, to Kaiser-Decett Constr. Co., 416 Rialto Sq., Joliet, Ill. Est. $950,000.

N. Y., New York—W. J. Salmon, 11 West 42nd St., 58 story, 100 x 208 ft., incl. stores, 5th Ave. and 42nd St., to C. T. Wills, 285 5th Ave. Est. $10,000,000.

N. Y., New York—C. Vanderbilt, c/o Rude Realty Corp., A. N. Bing, in charge, 18 East 48th St., 30 story, incl. showrooms, 501 Madison Ave., separate contracts. $1,000,000. F. Vitolo & R. Kohn, 56 West 45th St., archts.

N. C., Durham—H. B. Lane, 6 story, basement, 61 x 84 ft., to G. W. Kane, 1st. Natl. Trust Co. Bldg., $150,000. Noted May 2.

BANKS

Proposed Work

Calif., Salinas—Salinas Natl. Bank sketches by Swartz & Ryland, 301 Pearl St. Monterey, 6 story, basement, steel, concrete incl. offices, $200,000.

Del., Wilmington—Industrial Trust Co., 10th and Shipley Sts., soon takes bids 8 story, 68 x 110 ft., brick, steel addition. $200,000. Haugaard & Haugaard, 185 Madison Ave., New York, archts.

Ga., Atlanta—Fourth Natl. Bank, J. K. Ottley, pres., plans by Pringle & Smith, Norris Bldg., 15 story, basement, 110 x 120 ft., brick, steel, rein.-con. addition, incl. offices, plain found., Peachtree St. $600,000.

N. J., Jersey City—W. Neumann, archt., 40 Journal Sq., soon lets contract altering and constructing 3 story, brick, steel addition, plain found., 638 Newark Ave., for Commercial Trust Co., 15 Exchange Pl. $150,000. Noted June 27.

N. J., Point Pleasant—Point Pleasant Beach Natl. Bank sketches by Tilgham Moyer Co., Allentown, Pa., 1 story, basement, brick, steel, $150,000.

O., Toledo—Mills, Rhines & Bellman & Nordhoff, archts., Ohio Bank Bldg., soon lets contract 22 story, basement, brick, steel, rein.-con. incl. offices Madison Ave., for Ohio Savings & Trust Co., Madison Ave. $3,000,000. Noted July 4.

Okla., Chickasha—Okla. Natl. Bank sketches by E. H. Eads, 6 story, basement, 75 x 140 ft., incl. offices, Main St. $200,000.

Ont., Toronto — Dominion Bank, King and Yonge Sts., plans by J. M. Lyle, 230 Bloor St. W., 3 story, basement, brick, concrete, stone, Yonge and Gerrard Sts. Est. $150,000.

Que., Sherbrooke—Bank of Montreal 3 story, brick, stone.

Bids Asked

Mass., Fall River—Fall River Co-Operative Bank, A. A. Allen, treas., taking bids 2 story, basement, rein.-con., brick, steel, Bedford St. $150,000. J. M. Darling, 56 North Main St., archt.

N. J., Cliffside—W. Mayer, Jr., archt., 711 Bergenline Ave., West New York, bids about Aug. 15, general contract 2 story, basement, brick, steel, lain found., Crescent Lane and Anderson Ave., for Cliffside Park Title Guarantee & Trust Co., Grantwood. $150,000. Noted June 28.

Contracts Awarded

Calif., Los Angeles—Local Syndicate organized by officials Western Natl. Bank, 12 story, basement, on 132 x 150 ft. site, to P. J. Walker Co., W. M. Garland Bldg., to exceed $500,000. Noted June 13.

N. J., Elizabeth—Oakley & Son, archts., 1259 Clinton Pl., general contract 2 story, basement, brick, steel, bank, plain found., to C. Griffin, Townley, for Elmora State Bank, 605 Westfield Ave. Est. $150,000. Noted June 28.

N. J., Newark—Howard Savings Institution, 768 Broad St., general contract 1 story, basement, 55 x 110 ft., brick, steel, plain found., to R. A. Harvie Jr., 763 Broad St. Est. $150,000. Noted July 11.

N. Y., Binghamton—Chenango Valley Savings Bank, general contract 5 story, incl. offices, 76 Exchange Pl., to A. W. Bowie, Inc., Press Bldg. Est. exceeds $150,000.

N. Y., Flushing—National Bank of Queens County, 44 Main St., general contract, to W. E. Green, 70 East 45th St., New York. Noted June 20.

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THEATERS

Proposed Work

Calif., Los Angeles—Wyatt Park Sq. Theatre, c/o Morgan, Walls & Clements, archts., Van Nuys Bldg., 2 story, 131 x 160 ft., rein.-con., brick, 1,200 seating capacity, Grandview St.

Mass., Athol—Goldstein Amusement Co., 103 Spring St., Springfield, plans by Mowll & Rand, 21 School St., Boston, 1 story, basement, brick, steel, plain found. $150,000.

N. J., Paterson—A. E. Sleight & Son, archts., 136 Washington St., bids about Aug. 15, 1 story, basement, brick, steel, incl. stores, plain found. $200,000. Noted June 28.

Wis., Milwaukee—Polish Assn. of Milwaukee, c/o S. Kodow, archt., 208 Howell Ave., 3 story, 85 x 130 ft., granite, marble. $500,000.

Ont., Galt — Syndicate, G. A. Dobie (interested), 7 Concession St., plans by Murray Brown, 627 Confederation Life Bldg., Toronto, 80 x 160 ft., brick, steel, Water St. $175,000.

Que., Autremont—United Amusement Corp., 12 Major St., Montreal, plans by D. G. Crighton, 3641 Otenden Ave., Montreal. $1,000,000.

Bids Asked

Calif., Los Angeles — Security-First Natl. Trust & Savings Bank, trustees, taking bids 1 story, basement, 136 x 182 ft., brick, stone, steel, rein.-con., incl. garage in basement, Vermont Canyon, Griffith Park. $185,000. Park Dept. of Los Angeles, archt. Noted May 2.

Contracts Awarded

Calif., Oceanside—Bernard Mesa Estate, plans by E. G. Martin, Chester Williams Bldg., 100 x 200 ft., brick, concrete, incl. stores, garage and auto salesroom, to Pozzo Constr. Co., 421 Macy St., $175,000.

Mich., Muskegon—Continental Realty Co., 3 story, part basement, 130 x 155 ft., brick, steel, rein.-con., plain found., to Strom Constr. Co., 357 Houseman Bldg., Grand Rapids. Est. $350,000. Noted June 13.

N. Y. Peekskill—Netco Theaters, 1540 Bway, New York, 92 x 135 ft., to Thompson-Starrett Co., 250 Park Ave., New York. Est. $200,000. Noted June 20.

HOSPITALS

Proposed Work

Calif., Palo Alto—City plans by Reed & Corlett, Oakland Bank Bldg. and Bakewell & Brown, 251 Kearny St., San Francisco, Class A. $450,000.

Mass., Roxbury (sta. Boston)—Robert Bent Brigham Hospital, 125 Parker Hill Ave., sketches by Coolidge, Shepley, Bulfinch & Abbott, Ames Bldg., Boston, 3 story, basement, brick, steel, plain found., Parker Hill Ave. $150,000 or more.

Mo., Clayton — St. Louis Co., Court House, soon takes bids group 2, 3 and 4 story, basement, rein.-con., brick, stone buildings, North and South Rd., near here. $1,000,000. Aegerter & Baily, Ry. Exch., St. Louis, archts. Noted Sept. 13.

O., Cleveland—Cleveland Clinic Hospital, c/o G. Crite, East 93rd St. and Euclid Ave., sketches by Ellerbe & Co., 692 Endicott Bldg., St. Paul, Minn., 6 story, basement, brick, stone, steel, concrete, East 93rd St. and Euclid Ave. $500,000.

R. I., Pawtucket—Memorial Hospital, E. N. Littlefield, sketches by Monahan & Meikle, 255 Main St., probably brick, stone, Prospect and Beechwood Sts. $150,000 or more. Noted Dec. 27.

Wis., Milwaukee—City plans by C. E. Malig, City Hall, Johnson Emergency Hospital, 2 story, 108 x 116 x 152 ft., brick, plain found., 8th Ave.

Ont., Hamilton—Hamilton Hospital Bd., A. F. Hatch, chn., 71 Melrose Ave., plans by W. J. Walsh, Jr., Terminal Bldg., and bids in about 2 weeks, 1 story, basement addition to Victoria Ave., wing and 3 story basement addition to western wing, concrete steel $290,000. Noted Mar. 21.

Que., Montmagny—Rev. Sisters of Charity plans by Bergeron & Lemay, 145 St. John St., Quebec City, hospital. $300,000.

Que., Quebec City—Laval Hospital plans by R. Panicheilli, 20 Laurier Ave., addition, Ste. Foye Rd. $400,000.

Que., Verdun—City plans by Vian & Venne, 99 St. James St., Montreal, for civic hospital. $500,000.

Bids Asked

Ind., Indianapolis—Aug. 1, by City, brick, rein.-con. hospital, power plant, 960 Locke St. $516,000. Noted May 16.

Mass., Roxbury (sta. Boston)—New England Hospital for Women & Children, D. Horton, pres. Bd. Trustees, The Beaconsfield, Brookline, taking bids 3 story, basement, irregular sized children's building, brick, limestone, plain found., Dimock St. $200,000. Kendall, Taylor & Co., 142 Berkley St., Boston, archt. Noted July 4.

Contracts Awarded

Ill., Chicago—H. J. Lindstrand, archt., North and Crawford Aves., masonry and carpentry 5 story, 25 x 110 ft., brick, 1044-58 North Francisco Ave., to H. D. Moreland Co., 2761 Claybourne Ave., for Norwegian-American Hospital, 1044-58 North Francisco Ave. Est. $250,000.

Mass., Roxbury (sta. Boston) — Children's Hospital, G. L. Von L. Myer, 53 State St., Boston, 3 story, basement, brick, steel contagious ward building, plain found., to G. H. B. Macomber Co., 38 Chauncy St., Boston. $150,000 or more. Noted May 23.

Mich., Jackson — Mercy Hospital, 4 story, basement, brick, steel, rein.-con., stone addition, Lansing St., to North Moeller Co., Jackson. Est. $200,000.

N. Y., New York—L. S. M. B. Co., Inc., 1415 Zerga Ave., 1 story, sanitarium and professional building, to J. P. Hanigan, 55 West 42nd St. Est. $400,000.

N. Y., Long Island City—Hospital Eng. Co., 17 East 42nd St., New York, 7 story, 50 x 137 ft., brick, Doncaster Blvd. and Tudor Rd., to Loma Constr. Co., 17 East 42nd St., New York. Est. $650,000. Noted June 20.

Vt., Rutland—Rutland Hospital, M. Sawyer, chn. building com., altering and constructing 3 story, basement, brick, stone hospital addition and nurses home, to C. G. Noyes, 155 Adams St. $150,000 or more.

Ont., St. Catherines—Niagara Peninsula Sanitarium, 2 story, 38 x 185 ft., concrete, brick sanitarium, concrete found., Merrittville Rd., to W. H. Cooper, Clyde Blk., Hamilton. $150,000.

CLUBS

Proposed Work

N. J., Bound Brook—B. P. O. E. Lodge 1388, 2nd St., will not build 3 story, basement, brick, steel, plain found., Maiden Lane and 2nd St. $150,000. Project abandoned. Noted June 6.

N. J., Somerville—P. C. Van Nuys, archt., 1 West Main St., taking bids 3 story, basement, 70 x 150 ft., brick, steel, incl. storage, plain found., 149 West Main St., for Raritan Valley Aerie 2013, Fraternal Order Eagles. $150,000.

Tenn. Elizabethton—D. W. Brundage, et al., Gary, Ind., club house, golf course, swimming pool, tennis courts, $400,000; also sub-division, $100,000.

Bids Asked

N. J., Montclair—A. G. Brach, archt., 60 Park Pl., bids about Aug. 15, 2 story, basement, 150 x 200 ft., brick, steel, plain found. $200,000. Noted June 28.

N. J., Plainfield—C. C. Wendehack, archt., 101 Park Ave., New York, bids about Aug. 1, general contract on revised plans 2 story, basement, brick, stone, steel, plain found., Warrenville Rd., for Watchung Valley Country Club, Warrenville. $150,000. Noted July 18.

Contracts Awarded

Pa., Pittsburgh—Janssen & Cocken, archts., Century Bldg., 3 story, basement, 106 x 170 ft., steel, stone club, to W. T. Grange Constr. Co., Keenan Bldg., for Twentieth Century Club, c/o W. M. Smith, 5325 Wilkens Ave. Est. $200,000. Noted June 13.

Ont., Toronto—Metropolitan Church, Queen St. E., 2 story, basement, 160 x 170 ft., brick, steel, stone, concrete found., to Witchall & Son, 156 St. Helens Ave. Est. $150,000.

STORES

Bids Asked

Mass., Brockton — Colonial Realty Co., R. Grossman, 130 Granite St., Quincy, taking bids 3 story, basement, brick, stone, plain found., department store, Legion Parkway. $300,000. Miller & Levi, 46 Cornhill, Boston, archts. Montgomery Ward Co., Chicago Ave. and Larr St., Chicago, Ill., lessee. Noted June 20.

Contracts Awarded

Ill., Chicago—Schmidt, Garden & Ericksen, archts., 104 South Michigan Ave., masonry contract 3 story, 90 x 140 ft., tile, limestone, incl. studio, to A. Johnson, Evanston, for A. Younker, 134 North La Salle St. Est. $325,000. Noted May 9.

Mass., Boston—Mitchell-Woodbury Co., 560 Atlantic Ave., altering 5 story, basement, brick, steel, plain found., 55 Franklin St., to Whidden-Beekman Co., 250 Stuart St. $150,000 or more.

Mo., St. Louis—F. W. Woolworth & Co., W. M. Smith, local mgr., Pierce Bldg., 4 story, basement, 77 x 127 ft., rein.-con., brick, stone, terra cotta, to Humes-Deal Co., Arcade Bldg. Noted July 4.

Stores (Continued)

N. J., East Orange—E. H. Fougner, archt., 197 Market St., general contract 2 story, basement, store and office building, to Shore Constr. Co., 94 Christie St., Newark, for Main & Lincoln Realty Co., c/o architect. Est. $150,000. Noted June 20.

N. Y., New York—R. H. Macy & Co., 34th St. and Bway., altering and constructing top addition, to H. E. Milter, 505 5th Ave. Est. $150,000.

CHURCHES

Proposed Work

Conn., Hartford — St. Justin Parish, Blue Hills Ave., plans by Whiton & McMahon, archts. and engrs., 805 Main St., 75 x 172 ft. top addition, brick, limestone, steel. $250,000.

Mich., Lansing—First Presbyterian Church, 805 West Ionia St., plans by Lane, Davenport & Peterson, Charlevoix Bldg., Detroit, 2 story, basement, brick, steel, rein.-con., plain found., Ottawa St. $300,000.

N. Y., Brooklyn—Central Methodist Episcopal Church, 120 Lafayette Ave., plans by Halsey, McCormick & Helmer, 285 5th Ave., New York, 100 x 165 ft., Hanson Pl. and St. Felix St. $750,000.

N. Y., Rome—Zion Episcopal Church, E. H. Carhart, pastor, 701 North George St., incl. Sunday school, parish house. $165,000.

O., Lorain—Church of Christ Congregation, A. L. Hill, chn. building comn., raising $150,000 funds, 1 and 2 story, brick incl. Sunday school. J. W. Everhard, 9219 Clifton Blvd., Cleveland, archt.

Tex., Ft. Worth — Broadway Baptist Congregation, c/o J. J. Walden, chn. building com., plans by W. G. Clarkson & Co., 610 1st Natl. Bank Bldg., 2 story, basement, brick, rein.-con., St. Louis and Broadway Sts. $400,000. Noted Feb. 21.

Que., Levis—Rev. Missionaries of Africa, 32 Fraser St., plans by R. Chenevert, 30½ D'Aiguillon St., Quebec City, noviciate. $300,000.

Que., Montreal—Jewish Synagogue of N. D. G., new synagogue, Notre Dame de Grace Ave. $400,000.

Que., Montreal—Servant Sisters of the Sacred Name of Jesus, convent. $500,000.

Bids Asked

Calif., Pasadena—Bennett & Haskell, archts., 1st Trust Bldg., taking bids 2 story, basement, rein.-con., steel parish house, rectory, Euclid Ave., for All Saints Episcopal Church, Los Angeles. $200,000. Noted Mar. 21.

Mass., Salem—Grace Episcopal Church, c/o W. H. Ritter, archt., 1588 Beacon St., Brookline, taking bids altering and constructing 2 story, basement addition, incl. auditorium, 381 Essex St. $150,000. Noted May 23.

N. J., Newark—Anshe Russia Congregation (B. Brody), 53 Stratford Pl., bids about Aug. 15, 3 story, basement, 98 x 100 ft., brick, steel, synagogue, plain found., Sheperd and Schuyler Aves. $300,000. E. Gerber, 788 Broad St., archt. Noted June 28.

N. J., Perth Amboy—G. M. Ricci, archt., 216 Smith St., taking bids general contract 1 story, basement, brick, steel, plain found., Washington and Johnstone Sts., for Holy Cross Episcopal Church, c/o architect. $150,000.

Pa., Mt. Lebanon (mail Pittsburgh)—Owner, c/o Smith & Reif, assoc. archts., 1010 Professional Bldg., Pittsburgh, bids about Aug. 27, stone church. $200,000. L. Wolfe, Montgomery Ave. N. S., Pittsburgh, archts.

Pa., Phila.—July 30, by H. G. Dagit & Son, archts., 1322 Race St., 2 story, basement, 36 x 160 ft. and 60 x 97 ft., limestone, steel, plain found., Green and Cliveden Sts., for St. Madeleine Roman Catholic Church, A. M. Crane, pastor.

Mich., Detroit—Passionist Fathers Monastery, c/o A. Des Rosiers, archt., 620 McKerchey Bldg., 3 story, rein.-con., brick, monastery, plain found., to Talbot & Meier, 6853 Michigan Ave. Est. $300,000. Noted Apr. 4.

Mich., Detroit—St. Cecelia Parish, Livernois and Stearns Aves., 2 story, basement, 75 x 80 ft., and 1 story, 72 x 200 ft., brick, steel, stone, concrete, to W. E. Wood Co., 2714 Union Trust Bldg. Est. $200,000.

Mich., Detroit—Shrine of the Little Flower, 1705 Fairlawn Ave., Royal Oak, 2 story, basement, tower, 45 x 68 ft., brick, steel, rein.-con. church and shrine, plain found., Woodward Ave., to Bryant & Detwiler, 2806 Union Trust Bldg.

N. J., Newark—W. B. Willis, archt., 171 Madison Ave., New York, general contract 3 story, basement, brick, steel, plain found., to C. R. Hedden Co., 357 South Orange Ave., for Second Presbyterian Church, L. H. Clee, pastor, 636 Mt. Prospect Ave. Est. $200,000. Noted June 20.

Pa., Washington — Immaculate Conception Church, M. J. Hughes, rector, 1 story, basement, 152 x 164 ft. and 36 x 40 ft., limestone, brick, hollow tile incl. rectory, to Duquesne Constr. Co., Cypress and Aspen Sts., Pittsburgh. Est. $200,000. Noted June 23.

Ont., Toronto—Parish of Our Lady of Perpetual Help, F. J. Morrisey, pastor, 188 St. Clair Ave., E., 1 story, basement, 65 x 170 ft., concrete, stone, St. Clair Ave. E., to Witchall & Son, 156 St. Helens Ave. Est. $160,000.

UNCLASSIFIED

Proposed Work

Conn., East Hartford (br. Hartford)—WAREHOUSE — Economy Grocery Co., M. Joseloff, dist. mgr., Oakland Ave., plans by Monks & Johnson, 99 Chauncy St., Boston, Mass., 4 story, 60 x 160 ft., rein.-con., Oakland Ave. $150,000.

Ill., Chicago — HEAD HOUSE, etc. — One Hundred Twenty-Fourth Regiment Field Artillery plans by Perkins, Chatten & Hammond, 160 North La Salle St., brick head house, stables, completing drill hall, 52nd St. and Cottage Grove Ave. $1,000,000. F. A. Randall, 222 North Wells St., engr.

Ill., Chicago—PUBLISHING PLANT—J. M. Howells & R. M. Hood, archts., 431 Michigan Ave., and 40 West 40th St., New York, archts., bids probably late in fall general contract 20 story addition, for Chicago Tribune, 431 Michigan Ave., Smith & Brown, 307 North Michigan Ave., structural engrs.

Ky., Louisville—EXCHANGE and OFFICE—Southern Bell Telephone & Telegraph Co., 525 South 5th St., T. H. Kettig, local supt., sketches 7 story (ultimately 17 story), basement, 150 x 250 ft., 6th and Chestnut Sts. Total $2,500,000. W. C. Spiker, Forsyth Bldg., Atlanta, Ga., consult. engr. Noted July 11.

Md., Baltimore—MASONIC TEMPLE—C. H. Osborne, structural engr., 222 West Franklin St., bids early in August, general contract 4 story, Charles and 39th Sts., for Scottish Rite Masons, c/o J. E. Richardson, 19 East Baltimore St. $1,000,000. C. N. Fritz, Lexington Bldg., archt. C. L. Reeder, 916 North Charles St., mechanical engr. J. R. Pope, 542 5th Ave., New York, consult engr. Noted Apr. 11.

Mass., Worcester — ADMINISTRATION — Worcester City Hospital, C. O. Anderson, chn., sketches by Stevens & Lee, 45 Newbury St., Boston, brick, steel, at hospital. $150,000.

Mich., Grand Rapids — WAREHOUSE — Michigan Bell Telephone Co., 7 Fountain St. N. E., plans by Smith, Hinchman & Grylls, 800 Marquette Bldg., Detroit, 1 story, basement, 131 x 236 ft., brick, concrete, Division St. $180,000.

Mo., Kansas City—ART MUSEUM—William Rockhill Trust, c/o Wright & Wright, archts., 400 Natl. Bank Bldg., 3 story, 171 x 372 ft., rein.-con., brick, marble, limestone. $1,000,000. Noted Mar. 3, 1927.

N. J., Fort Lee—TALKING MOVING PICTURE STUDIO—Universal Pictures Corp., M. Leberman, in charge, 730 5th Ave., New York, 1 story, basement, brick, steel, plain found. $150,000.

N. Y., New York—STORAGE and MANUFACTURING—I. Kaufman, 139 East 24th St., plans by Gannava & Viviani, 690 8th Ave., altering 4 story, 235 East 123rd St. $500,000.

N. Y., West New Brighton—WAREHOUSE—W. P. Tanner & Gross & Co., 25 Beaver St., New York, rein.-con. $275,000. R. G. Cory, 30 Church St., New York, engr. and archt.

Okla., Oklahoma City—AUTOMOBILE—Buick Motor Co., sketches 6 story, basement, 75 x 140 ft., brick, rein.-con., plain found. 13th St. and Bway. $165,000. Engineer and architect not selected.

Okla., Oklahoma City—BALL ROOM—Midwest Ball Room Co., Tulsa, 2 story, 140 x 150 ft., brick, rein.-con., plain found., 4th and Western Ave. $200,000. Private plans.

Pa., Pittsburgh—GARAGE—Market House Garage, Inc., plans by D. A. Crone, 212 Oliver Bldg., 7 story, 100 x 100 ft. garage, 4th Ave. $250,000.

Tex., San Antonio — EXCHANGES — Southwestern Bell Telephone Co., 215 Travis St., c/o H. Martyn, supt., soon takes bids 7 story (ultimately 28 story), basement, Central Exchange, brick, steel, rein.-con., incl. offices, plain found., $750,000; also two 3 story, brick, rein.-con., exchanges, 1 at Woodlawn and other at Mission Exchanges, plain founds. Private plans. Noted Feb. 7.

Ont., Toronto — LABOR TEMPLE — Labor Temple Co. Ltd., 167 Church St., plans by R. H. Bishop, 42 Hastings St., labor temple, Bloor St. $400,000.

Que., Montreal—ART GALLERY—Art Assn. of Montreal plans by W. S. Maxwell, 1158 Beaur Hall Hill, art gallery addition. $250,000.

Que., Montreal—TERMINAL, etc.—Canadian Pacific R.R., J. J. M. R. Fairbairn, ch. engr., Montreal, new terminal, Mile End, and hotel on St. Lawrence St. $3,000,000.

Bids Asked

Ga., Atlanta—DEPOT, etc.—July 29, by Nashville, Chattanooga & St. Louis R.R., H. McDonald, ch. engr., Nashville, Tenn., c/o McDonald & Co., archts., 407 Southeastern Trust Co. Bldg., 1 story, ground floor, brick, stone, steel, rein.-con., depot, incl. waiting rooms, ticket offices, Forsyth and Spring Sts. $300,000.

Ill., Chicago — POST OFFICE — See "Residential."

N. J., Atlantic City — MAUSOLEUM — Memorial Park Mausoleum Co., E. R. Hutton, secy., 305 Schwein Bldg., taking bids separate contracts 1 story, basement, brick, steel, plain found., along English Creek. $200,000. Former bids rejected. O. Schmidt, Chelsea Bank Bldg., archt. Noted June 6.

N. J., Newark—ORPHANAGE—Daughters of Israel Hebrew Orphans Sheltering Institution, 12 Homestead Park, and L. Kasoff, archt., 164 Market St., bids about Aug. 1, general contract 3 story, basement, 80 x 140 ft., brick, steel, plain found., $150,000. Noted July 11.

Pa., Lansdowne—EXCHANGE—July 27, by J. T. Windrim, archt., Commonwealth Bldg., Phila., 2 story, basement, 31 x 103 ft., rein.-con., brick, steel, plain found., Baltimore and Highland Sts., for Electric Realty Corp., c/o architect.

Pa., Harrisburg—STATE FARM SHOW—Aug. 23, by Commonwealth of Pennsylvania, B. E. Taylor, secy., Property & Supplies, State Farm Show Building. F. St. Clair, Jr., ch. engr.; adv. E. N.-R. July 25.

Ont., Windsor—WAREHOUSE—Aug. 6, by S. E. O'Brien, secy. P. Wks. Ottawa, 2 extensions to government warehouse, other improvements at wharf.

Bids Received

Calif., Glendale—FIRE STATION—City, 3 story, 70 x 75 ft., brick, steel, rein.-con., Howard and Orange Sts., from C. A. Schweissinger Jr., 627 Loomis St., Los Angeles, $62,917. Est. $75,000.

Calif., Patton—KITCHEN, etc.—G. M. McDougall, state archt., Sacramento, rein.-con. kitchen and bakery, Patton State Hospital, general contract, from Security Constr. Co., Riverside, $77,000.

Contracts Awarded

Calif., Alhambra—RECREATION CENTER—Biarritz, Inc. J. J. Tyrell, pres., 1328 East Main St., brick, steel, concrete, incl. theatre, banquet halls on a 286 x 400 ft. site, to F. C. Schellan, 644 North San Gabriel Blvd., San Gabriel. $500,000. Total $1,000,000. Noted July 18.

Calif., San Diego—EXCHANGE—Pacific Telegraph & Telephone Co., steel, rein.-con. top addition, to Ryder-Nelson Co., Beaux Arts Bldg., $175,000. Noted June 18.

Calif., Los Angeles—GARAGE and SALES—Community Securities Corp. of Hollywood, 2 story, 140 x 230 ft., brick, rein.-con., stone, to Meyer & Holler, Wright & Callendar Bldg., $195,500.

Conn., Saybrook—STUDIO—Alden Film Corp., A. Miller, 220 West 42nd St., New York, brick, rein.-con., plain found., to W. W. Rochette, Saybrook Manor, Saybrook. Est. $150,000.

Ill., Chicago—GARAGE—Wells Jackson Corp., 510 North Michigan Ave., masonry contract, 7 story, 136 x 153 ft., to Foltz & Co., 510 North Michigan Ave., own forces. Est. $600,000. Noted Feb. 14.

La., New Orleans—MEDICAL and GARAGE—W. A. Walsingham & M. Molero, 5 story, 90 x 126 ft., brick, steel, rein.-con., to J. V. & R. T. Burkes, Orleans Bank Bldg., $200,000. Noted May 9.

Mass., Somerville (br. Boston)—HISTORICAL—Somerville Historical Society, A. S. Haskell, pres., 60 Putnam St., 3 story, basement, brick, limestone, plain found., to F. O. White Constr. Co., 100 Everett St., Arlington. Est. $150,000. Noted July 4.

N. Y., Jamestown—EXCHANGE—Jamestown Telephone Co., 3 story, basement, 60 x 130 ft. brick, rein.-con., to Lundoff-Bicknell Co., B. F. Keith Bldg., Cleveland, O. Est. $150,000. Noted July 18 under "Buildings—Commercial."

N. Y., New York—MUSIC HALL and ASSEMBLY—American Academy of Arts & Letters, 633 West 155th St., general contract, to Thompson-Starrett Co., 250 Park Ave., contractor takes bids about July 27, sub-contracts. Noted July 11.

O., Toledo—WAREHOUSE—Spicer Mfg. Co., Bennett Rd., 2 story, brick, steel, plain found., Bennett Rd., to A. Bentley & Sons Co., Belmont St. Est. $45,000.

Pa., Pittsburgh—MERCANTILE—Boulevard Development Co., 3 story, basement, Wood and Diamond Sts., to Henry Shenk Co., Century Bldg.

Ont., Toronto—EXCHANGE—Bell Telephone Co. of Canada, 76 Adelaide St. W., general contract 4 story addition to present Elgin Exchange and new 9 story, 70 x 100 ft., brick, rein.-con., structural steel addition, Temperance St., to Robertson & Janin of Ontario, Ltd., Commerce and Transportation Bldg.; excavation, to Bonvivere Constr. Co., Confederation Life Bldg. Est. $950,000.

Ont., Toronto—WAREHOUSE—Great Atlantic & Pacific Tea Co., Terminal Bldg., general contract 3 story, basement, concrete, brick, steel, to L. L. Leveque, c/o S. A. Frye, King Edward Hotel; excavation, to Lione & Co., 1411 Dufferin St. Est. $175,000.

See proposal advertising on page 123

Constr. News page 53

UNIT PRICES

Street Improvement—Knoxville, Tenn.

City opened bids July 1 grading, curbing, guttering, installing sewers and paving with 1 in. sheet asphalt on 1½ in. binder course 9,725 sq.yd.; 2 in. asphaltic concrete surfacing 33,275 sq.yd.; 6 in. concrete paving 42,000 sq.yd. Bidders are: (A) Murray Construction Co., Sprankle Bldg., (awarded contract); (B) Southern Paving Construction Co. N. Bass, city manager.

			A	B
9,725 sq.yd. 1 in. sheet asphalt surface			$0.35	$0.43
9,725 sq.yd. 1½ in. asphalt binder course			.32	.30
33,275 sq.yd. 2 in. A.C. wearing surface			.58	.64
42,000 sq.yd. 6 in. conc. paving, class "A" mix			1.24	1.36
43,000 sq.yd. 6 in. conc. base, class "B" mix			.95	1.09
11,000 lin.ft. transverse expansion joints			.05	.09
10 tons binder in place			6.50	8.00
50,000 cu.yd. earth excav.			.34	.43
3,000 cu.yd. earth embankment			.05	.05
150 cu.yd. solid rock in subgrade			2.00	2.50
200 cu.yd. solid rock in trench			5.00	5.00
200 cu.yd. shale in subgrade			1.00	1.00
200 cu.yd. shale in trench			2.00	2.50
100 cu.yd. structure excav.—dry			1.00	1.00
25 cu.yd. structure excav.—rock			5.00	5.00
8,747 lin.ft. old curb and header removed			.07	.10
1,000 lin.ft. overhaul 2,000 ft. on curb and header			.01	.02
7,000 lin.ft. old gutter removed			.07	.10
1,000 lin.ft. overhaul 2,000 ft. on old gutter			.01	.02
177 lin.ft. old culvert removed			1.00	1.00
36 lin.ft. trees removed, 6 in. diam. and over			8.00	10.00
15,370 lin.ft. conc. curb, 6x18 straight			.45	.45
100 lin.ft. conc. curb, 6x18 circular, without ex. conc.			.60	.55
500 lin.ft. conc. curb, 6x18 circular, with ex. conc.			.95	.60
22,804 lin.ft. conc. curb, 6x14 straight			.17	.20
825 lin.ft. conc. curb, 6x14 circular, without ex. conc.			.18	.45
3,080 lin.ft. conc. curb, 6x8 integral			.10	.25
200 sq.ft. conc. gutter in place			.25	.175
4,765 sq.yd. conc. sidewalk, complete			1.20	1.25
955 sq.yd. 6 in. conc. driveway			1.70	1.50
300 lin.ft. 4 in. c.i. drain pipe			.55	.50
260 lin.ft. conc. header, complete			.22	.20
4,000 lin.ft. stone curb reset			.20	.35
150 cu.yd. conc., class "C" mix			14.00	13.50
100 cu.yd. conc., class "D" mix			13.50	12.50
20,000 lb. reinforcing steel in place			.04	.045
800 sq.yd. remov. old asphalt, conc. paving, base and sidewalk			.25	.25
Sewer Pipe		Depth		
1,000 lin.ft.	6 in.	0–4 ft.	.44	.45
2,500 lin.ft.		4–6 ft.	.47	.50
1,509 lin.ft.		6–8 ft.	.59	.65
1,000 lin.ft.		8–10 ft.	.89	1.00
200 lin.ft.	8 in.	0–4 ft.	.52	.50
400 lin.ft.		4–6 ft.	.57	.60
200 lin.ft.		6–8 ft.	.75	.75
200 lin.ft.		8–10 ft.	.95	1.15
895 lin.ft.	12 in.	0–4 ft.	.75	.72
630 lin.ft.		4–6 ft.	.85	1.00
300 lin.ft.		6–8 ft.	1.00	1.10
350 lin.ft.	15 in.	0–4 ft.	.99	1.00
645 lin.ft.		4–6 ft.	1.10	1.10
300 lin.ft.		6–8 ft.	1.28	1.25
200 lin.ft.		8–10 ft.	1.68	1.75
100 lin.ft.	18 in.	0–4 ft.	1.35	1.35
475 lin.ft.		4–6 ft.	1.47	1.50
600 lin.ft.		6–8 ft.	1.68	1.65
200 lin.ft.		8–10 ft.	1.98	2.10
250 lin.ft.	24 in.	4–6 ft.	2.42	2.50
375 lin.ft.		6–8 ft.	2.75	2.7
200 lin.ft.		8–10 ft.	3.35	3.25
150 lin.ft.		10–12 ft.	4.05	3.75
200 lin.ft.	30 in.	4–6 ft.	4.30	4.25
200 lin.ft.		6–8 ft.	4.54	4.50
100 lin.ft.		8–10 ft.	5.25	4.75
200 lin.ft.	36 in.	4–6 ft.	7.00	5.6
250 lin.ft.		6–8 ft.	7.50	5.90
100 lin.ft.		8–10 ft.	8.90	6.25
300 6 in. bends			.55	.75
50 8x6 in. wyes			.70	1.50
200 lin.ft. 6 in. cast iron pipe, class "B"			1.25	1.00
50 lin.ft. 8 in. cast iron pipe, class "B"			1.60	1.25
5 sewer manholes,		0–4 ft. deep	35.00	32.50
5		4–6 ft.	45.00	42.50
8		6–8 ft.	55.00	52.50
4		8–10 ft.	75.00	70.00
25 catch basins, 1-A, 1-B, 1-BB,		0–4 ft. deep	40.00	37.50
35		4–6 ft.	50.00	47.50
15		6–8 ft.	63.00	57.50
10		8–10 ft. deep	$78.00	$70.00
1 catch basin No. 2,		0–4 ft.	63.00	60.00
2 No. 2,		4–6 ft.	72.00	70.00
3 No. 4,		0–4 ft.	42.00	40.00
3 No. 4,		4–6 ft.	50.00	50.00
3 No. 5,		0–4 ft.	37.50	60.00
3 No. 5,		4–6 ft.	45.00	70.00
15,000 lin.ft. 0–4 ft. trench and backfill for water mains, less 6 in			.24	25
7,000 lin.ft. 4–6 ft. trench and backfill for water mains, less 6 in			.21	.30
1,000 lin.ft. 6–8 ft. trench and backfill for water mains, less 6 in			.38	.40
Trenching and Backfilling for Water Mains		Depth		
10,000 lin.ft.	for 6 in.	0–4 ft.	.24	.25
4,000 lin.ft.		4–6 ft.	.27	.30
2,000 lin.ft.		6–8 ft.	.38	.40
300 lin.ft.		8–10 ft.	.50	.75
200 lin.ft.	for 8 in.	0–4 ft.	.24	.25
100 lin.ft.		4–6 ft.	.27	.30
50 lin.ft.		6–8 ft.	.38	.40
50 lin.ft.		8–10 ft.	.50	.75
1,000 lin.ft.	for 10 in.	0–4 ft.	.24	.30
800 lin.ft.		4–6 ft.	.27	.35
300 lin.ft.		6–8 ft.	.38	.40
200 lin.ft.		8–10 ft.	.50	.80
100 lin.ft.	for 12 in.	0–4 ft.	.30	.50
200 lin.ft.		4–6 ft.	.44	.60
50 lin.ft.		6–8 ft.	.60	.80
50 lin.ft.		8–10 ft.	.80	1.00
200 lin.ft.	for 16 in.	4–6 ft.	.47	1.00
50 lin.ft.		6–8 ft.	.63	1.50
50 lin.ft.		8–10 ft.	.85	2.00
300 cu.yd. rock excav. in water trench			5.00	5.00
42,000 sq.yd. 5 yr. maintenance on conc. paving			.02	.02
43,000 sq.yd. 5 yr. maint. on asphaltic conc. paving			.02	.02
43,000 sq.yd. curing conc. base with $CaCl_2$ admix't re.			.01	.02
Totals			$206,540	$229,220
Plus 10%			20,654	22,922
42,000 sq.yd. curing conc. paving with $CaCl_2$ admxt.			.01	.02
Grand totals			227,195	252,142
Time to complete			95 days	Before Mar. 1, 1930

Engineering News-Record, Issue of July 25, 1929.

Bridge—Texas

State Highway Department, Austin, opened bids May 24, Trinity River bridge and approaches, concrete and steel, F. A. P. 352-B, Liberty Co. Bidders are: (A) Austin Bridge Co., Box 1094, Dallas, (awarded contract); (B) Missouri Valley Bridge & Iron Co., Dallas; (C) Tellepsen Construction Co., Houston. G. Gilchrist, state highway engineer.

	A	B	C
3.63 acres clearing	$40.00	$35.00	$253.50
2,428 cu.yd. unclass. excav.	.35	.20	1.00
10,710 cu.yd. borrow	.35	.22	1.34
2,658 sta. overhaul	.04	.05	.06
267 cu.yd. bridge excav. Class "A"	1.00	8.00	2.52
1,291.2 cu.yd. bridge excav. Class "B"	10.00	8.00	13.25
894.3 cu.yd. oyster shell furnished on job	2.00	1.75	2.45
894.3 cu.yd. shell surface course	.60	.40	3.17
896.4 cu.yd. shell surface course hauled additional ½ mi	.06	.06	.12
356.6 cu.yd. Class "A" conc. plus 10% cement	18.00	30.00	12.80
1,502.89 cu.yd. Class "A" conc. for girders	18.75	25.00	28.25
734.3 cu.yd. Class "A" conc. for piers	18.75	26.00	20.45
433.2 cu.yd. Class "B" conc. for piers	18.00	23.00	14.20
254.4 cu.yd. Class "D" conc. (truss floors)	19.50	27.00	28.89
428,312 lb. reinf. steel	.04	.05	.0493
675,000 lb. struc. steel (trusses)	.066	.075	.084
150,000 lb. struc. steel (pier, shells)	.066	.055	.0684
11.66 sta. sodding	6.00	6.00	63.95
9,910 lin.ft. untreat. timber piling	.75	1.10	1.02
4,400 lin.ft. 14 in. square precast conc. piling	2.10	3.00	3.00
7,865 lin.ft. 16 in. square precast conc. piling	2.75	4.00	2.99
2,015 lin.ft. conc. bridge railing Class "D"	1.80	2.00	2.40
48 lin.ft. conc. bridge rail (special)	3.30	3.54	6.30
96 pair conc. girder expansion plates	30.00	23.00	36.57
Totals	$189,938	$232,305	$251,083

Engineering News-Record, Issue of July 25, 1929.

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